# HOPKINS & UNDERWOOD'S NEW ARITHMETIC

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## MENTAL

THE MACMILLAN COMPANY

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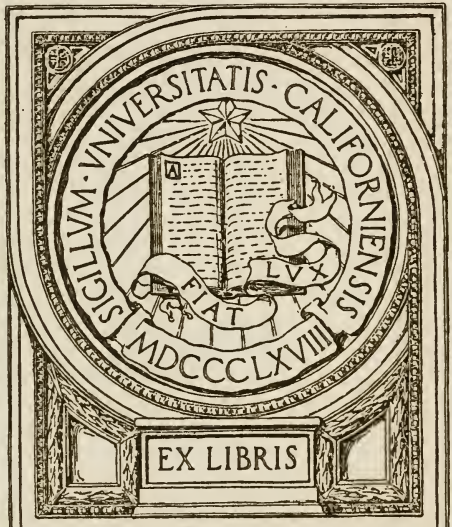

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# MENTAL ARITHMETIC

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# MENTAL ARITHMETIC

BY

JOHN W. HOPKINS

SUPERINTENDENT OF THE GALVESTON SCHOOLS

AND

P. H. UNDERWOOD

TEACHER OF MATHEMATICS IN THE BALL HIGH SCHOOL
GALVESTON, TEXAS

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# PREFACE

THE purpose of mental arithmetic is to enable pupils to perform the simple computations which occur daily in business life, to introduce them to the art of reasoning, and to train them to think on their feet.

In writing this book the authors have aimed to give a large number and variety of easy exercises in the essentials of arithmetic; namely, the four fundamental rules, fractions, decimals, simple measurements, and per cent. They have kept to the core of the subject and have not allowed themselves to be diverted by the methods and practices of other text-book writers on this subject. Accordingly, conundrums which have done service for generations have been omitted. The hound no longer chases the hare; the fish with large head and long tail swims undisturbed in the briny deep; the ass and the mule sigh no more over their heavy burdens.

The authors have endeavored to make the book



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an embodiment of the Socratic method of development. Witness the Decimal System of Notation, Compound Quantities, and Per Cent.

Throughout this book and the other books of this series, namely, the "Primary Arithmetic" and the "Elements of Arithmetic," the authors have closely adhered to modern mathematical and business methods of computation. Teachers are, as a rule, very conservative, and they are prone to adhere to old methods long after the old methods have become antiquated. As a result, pupils must unlearn as soon as they leave the schoolroom to enter any line of modern business many things they have been taught. To give an illustration: the method of reckoning change taught in the schoolroom does not accord with the actual common-sense business method. The business method of performing subtraction (the computers' method which is followed throughout this series of arithmetics) gives a thousand times better insight into the nature of subtraction from a rigorous mathematical standpoint than any of the other methods in use. The teacher who may be inclined to doubt this statement would do well to consult some standard authority on the nature of the fundamental rules, for example,

Durege, Professors Harkness and Morley, and Professor Chrystal.

Stress has been laid on the unit or analytic method of solution. This has been done whenever the authors have thought the method named to be the simplest. This is the case in Fractions, Decimals, and Proportion.

Mental arithmetic precludes the use of pencil and paper. The addition of long columns of figures, the multiplication of large numbers by other large numbers, the solution of complex examples which authors themselves could not perform orally, have no place in a mental arithmetic. The examples in a mental arithmetic should be of such nature that the average pupil may be trained to perform them orally with ease, pleasure, and profit. Pupils find enjoyment in making with alacrity simple arithmetical calculations, and if they are well drilled in this, they will attack the more complex problems in written arithmetic with greater vim and determination.

Throughout this book as well as throughout the other books of this series the authors have given close attention to the demands of modern business and modern life. The books have been written also from the mathematical point of view. The problem they

have attempted to solve is to bring within the comprehension of the young learner as much of the rationale of mathematics as possible. "As the twig is bent, the tree is inclined." Start the pupil properly in mathematics, and he will not only become a better computer, but he will acquire a firmer grasp of the logic underlying mathematical processes. Start the pupil on the wrong track, and he is likely to wander aimlessly all his life. Experience of many years in the class room has forcibly brought to mind how hard it is to eradicate wrong arithmetical ideas acquired in early life.

THE AUTHORS.

GALVESTON, TEXAS,
May 25, 1903.

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# MENTAL ARITHMETIC

## ADDITION

### No. 1

1. A pair of shoes cost $3 and a hat cost $4. What did both cost?

2. A ton of coal cost $7 and a cord of wood cost $4. What did both cost?

3. If I buy two sheep, one for $6 and the other for $5, what do both cost?

4. A lady buys two hats, one for $8 and the other for $3. What does she pay for the two hats?

5. How many are 5 pencils and 3 pencils? How many are 7 apples and 5 apples?

6. How many are 8 books and 5 books?

7. A boy buys 2 pencils for 5¢ and a writing-pad for 9¢. How many cents does he pay for both?

8. If you walk 4 miles in the morning and 7 miles in the afternoon, how many miles do you walk?

9. A boy has 8 chickens and buys 5 more. How many chickens does he then have?

**10.** If a lady buys two pictures, paying $9 for one and $5 for the other, what does she pay for both?

**11.** If a lady buys two rugs, paying $9 for one and $8 for the other, what does she pay for both?

**12.** A farmer buys two plows, paying $10 for one and $9 for the other. What does he pay for both plows?

**13.** If a boy is 8 years old, how old will he be 7 years from now?

**14.** Henry had 10 marbles and bought 7 more. How many did he then have?

**15.** A farmer had 9 cattle in one field and 6 in another. How many cattle had he in both fields?

**16.** If a lady plants 4 rosebushes one day and 9 another, how many does she plant in the two days?

**17.** A dealer sells 9 sacks of flour Monday and 7 sacks Tuesday. How many sacks does he sell in the two days?

**18.** A farmer buys 4 bushels of feed one week and 8 bushels the next. How many bushels does he buy in the two weeks?

**19.** A farmer has 6 horses in one stable and 7 in another. How many has he in both stables?

**20.** Two trains pass a station; one has 6 coaches, the other 7. How many coaches have the two trains?

**21.** In two adjoining blocks in a certain city there are 8 houses and 7 houses. How many houses are in the two blocks?

**22.** There are 9 books on one shelf of a bookcase and 10 on another. How many books are on the two shelves?

**23.** If a farmer plants 9 acres in corn and 8 acres in oats, how many acres does he plant in both?

**24.** A furniture dealer sells two tables, one for $11 and the other for $5. What does he get for the two tables?

**25.** A schoolboy buys a suit of clothes and a pair of shoes; he pays $12 for the suit of clothes and $4 for the shoes. What does he pay for both?

**26.** How many letters are in the two words, United States?

**27.** How many letters are in the two words, Alabama, Georgia?

**28.** There are three stations on a railroad, A, B, C. From A to B is 11 miles. From B to C is 6 miles. How many miles are there between A and C?

## No. 2

### Addition Table

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

## No. 3

**1.** How many are: 9 and 8? 9 and 7? 9 and 6? 9 and 5? 9 and 4?

**2.** How many are: 10 and 12? 10 and 11? 10 and 9? 10 and 8? 10 and 7? 10 and 6? 10 and 5? 10 and 4? 10 and 3? 10 and 2?

**3.** How many are: 11 and 12? 11 and 11? 11 and 10? 11 and 9? 11 and 8? 11 and 7? 11 and 6? 11 and 5? 11 and 4? 11 and 3? 11 and 2? 11 and 1?

**4.** How many are: 12 and 12? 12 and 11? 12 and 10? 12 and 9? 12 and 8? 12 and 7? 12 and 6? 12 and 5? 12 and 4? 12 and 3? 12 and 2? 12 and 1?

**5.** How many are: 8 and 12? 8 and 11? 8 and 10? 8 and 9? 8 and 8? 8 and 7? 8 and 6? 8 and 5? 8 and 4? 8 and 3? 8 and 2? 8 and 1?

**6.** How many are: 7 and 12? 7 and 11? 7 and 10? 7 and 9? 7 and 8? 7 and 7? 7 and 6? 7 and 5? 7 and 4? 7 and 3? 7 and 2? 7 and 1?

**7.** How many are: 6 and 12? 6 and 11? 6 and 10? 6 and 9? 6 and 8? 6 and 7? 6 and 6? 6 and 5? 6 and 4? 6 and 3? 6 and 2? 6 and 1?

**8.** How many are: 5 and 12? 5 and 11? 5 and 10? 5 and 9? 5 and 8? 5 and 7? 5 and 6? 5 and 5? 5 and 4? 5 and 3? 5 and 2? 5 and 1?

**9.** How many are: 4 and 12? 4 and 11? 4 and 10? 4 and 9? 4 and 8? 4 and 7? 4 and 6? 4 and 5? 4 and 4? 4 and 3?

**10.** How many are: 9 and 12? 9 and 7? 9 and 6? 9 and 11? 9 and 10?

**11.** How many are: 7 and 6? 6 and 7? 8 and 6? 6 and 8? 7 and 5?

**12.** How many are: 5 and 9? 9 and 6? 5 and 8? 5 and 11? 5 and 12?

**13.** How many are: 4 and 11? 7 and 11? 6 and 12? 6 and 10? 6 and 11?

**14.** How many are: 5 and 11? 5 and 10? 11 and 7? 12 and 6?

## No. 4

| | | | | | |
|---|---|---|---|---|---|
| 7 | 4 | 8 | 3 | 9 | 5 |
| 1 | 11 | 10 | 12 | 2 | 6 |

Add in succession to each of the above numbers 5, 3, 7, 6, 4, 9, 8, 2, 1.

To the Teacher. Sums only should be announced. Demand accuracy and rapidity.

**1.** If there are 11 acres in one field and 9 acres in another, how many acres are in both fields?

**2.** If one meadow produces 10 tons of hay and another produces 12 tons, how many tons do both meadows produce?

**3.** There are 9 rooms in one schoolhouse and 12 rooms in another. How many rooms are in both?

4. Henry Jones is 11 years old. How old will he be 8 years from now?

5. If in a class there are 9 pupils studying grammar and 8 studying spelling, how many pupils are studying both subjects?

6. A steamer consumes 8 tons of coal on Monday and 12 tons on Tuesday. How many tons does it consume in the two days?

7. Two maps were bought for a schoolroom; one cost $7 and the other cost $11. How much did both maps cost?

8. A boy walks 5 miles and then rides 9 miles. How many miles does he go?

9. If a boy buys a slate for 12¢ and a tablet for 9¢, how much money does he spend?

## No. 5

How many are:

1. 6 and 5? 6 and 15? 6 and 25? 6 and 35? 6 and 45? 6 and 55? 6 and 65? 6 and 75? 6 and 85? 6 and 95?

2. 7 and 4? 7 and 14? 7 and 24? 7 and 34? 7 and 44? 7 and 54? 7 and 64? 7 and 74? 7 and 84? 7 and 94?

3. 8 and 3? 8 and 13? 8 and 23? 8 and 33? 8 and 43? 8 and 53? 8 and 63? 8 and 73? 8 and 83? 8 and 93?

**4.** 9 and 2? 9 and 12? 9 and 22? 9 and 32? 9 and 42? 9 and 52? 9 and 62? 9 and 72? 9 and 82? 9 and 92?

**5.** 6 and 6? 6 and 16? 6 and 26? 6 and 36? 6 and 46? 6 and 56? 6 and 66? 6 and 76? 6 and 86? 6 and 96?

**6.** 7 and 5? 7 and 15? 7 and 25? 7 and 35? 7 and 45? 7 and 55? 7 and 65? 7 and 75? 7 and 85? 7 and 95?

**7.** 8 and 5? 8 and 15? 8 and 25? 8 and 35? 8 and 45? 8 and 55? 8 and 65? 8 and 75? 8 and 85? 8 and 95?

**8.** 9 and 3? 19 and 3? 29 and 3? 39 and 3? 49 and 3? 59 and 3? 69 and 3? 79 and 3? 89 and 3? 99 and 3?

**9.** 6 and 7? 16 and 7? 26 and 7? 36 and 7? 46 and 7? 56 and 7? 66 and 7? 76 and 7? 86 and 7?

**10.** 7 and 6? 17 and 6? 27 and 6? 37 and 6? 47 and 6? 57 and 6? 67 and 6? 77 and 6? 87 and 6?

**11.** 8 and 5? 18 and 5? 28 and 5? 38 and 5? 48 and 5? 58 and 5? 68 and 5? 78 and 5? 88 and 5?

**12.** 9 and 4? 19 and 4? 29 and 4? 39 and 4? 49 and 4? 59 and 4? 69 and 4? 79 and 4? 89 and 4?

**13.** 6 and 8? 16 and 8? 26 and 8? 36 and 8? 46 and 8? 56 and 8? 66 and 8? 76 and 8? 86 and 8?

**14.** 7 and 7? 17 and 7? 27 and 7? 37 and 7? 47 and 7? 57 and 7? 67 and 7? 77 and 7? 87 and 7?

**15.** 8 and 6? 18 and 6? 28 and 6? 38 and 6? 48 and 6? 58 and 6? 68 and 6? 78 and 6? 88 and 6?

**16.** 9 and 5? 19 and 5? 29 and 5? 39 and 5? 49 and 5? 59 and 5? 69 and 5? 79 and 5? 89 and 5?

**17.** 6 and 9? 16 and 9? 26 and 9? 36 and 9? 46 and 9? 56 and 9? 66 and 9? 76 and 9? 86 and 9?

**18.** 7 and 8? 17 and 8? 27 and 8? 37 and 8? 47 and 8? 57 and 8? 67 and 8? 77 and 8? 87 and 8?

**19.** 8 and 7? 18 and 7? 28 and 7? 38 and 7? 48 and 7? 58 and 7? 68 and 7? 78 and 7? 88 and 7?

**20.** 9 and 6? 19 and 6? 29 and 6? 39 and 6? 49 and 6? 59 and 6? 69 and 6? 79 and 6? 89 and 6?

**21.** 7 and 9? 17 and 9? 27 and 9? 37 and 9? 47 and 9? 57 and 9? 67 and 9? 77 and 9? 87 and 9?

**22.** 8 and 8? 18 and 8? 28 and 8? 38 and 8? 48 and 8? 58 and 8? 68 and 8? 78 and 8? 88 and 8?

**23.** 9 and 7? 19 and 7? 29 and 7? 39 and 7? 49 and 7? 59 and 7? 69 and 7? 79 and 7? 89 and 7?

**24.** 8 and 9? 18 and 9? 28 and 9? 38 and 9? 48 and 9? 58 and 9? 68 and 9? 78 and 9? 88 and 9?

**25.** 9 and 8? 19 and 8? 29 and 8? 39 and 8? 49 and 8? 59 and 8? 69 and 8? 79 and 8? 89 and 8?

**26.** 9 and 9? 19 and 9? 29 and 9? 39 and 9? 49 and 9? 59 and 9? 69 and 9? 79 and 9? 89 and 9?

**27.** 56 and 9? 17 and 8? 24 and 6? 84 and 6? 74 and 8? 73 and 9? 81 and 9? 62 and 9? 52 and 8? 58 and 8? 78 and 8?

**28.** 21 and 7? 35 and 9? 36 and 6? 87 and 7? 67 and 9? 54 and 9? 44 and 8? 84 and 9? 65 and 8?

**29.** 27 and 9? 37 and 5? 87 and 8? 82 and 8? 23 and 7? 32 and 9? 63 and 6? 74 and 9? 76 and 8? 26 and 9?

**30.** 16 and 8? 17 and 7? 14 and 9? 19 and 9? 29 and 8? 39 and 7? 49 and 6? 89 and 9? 79 and 9? 69 and 9? 88 and 9?

**31.** 78 and 8? 68 and 7? 67 and 8? 77 and 9? 27 and 9? 17 and 8? 13 and 9? 23 and 9? 12 and 9? 42 and 9? 11 and 9? 21 and 9? 51 and 9? 11 and 8? 71 and 8? 91 and 7?

**32.** 92 and 8? 12 and 8? 15 and 7? 25 and 7? 75 and 7? 85 and 5? 15 and 5? 70 and 10? 10 and 10? 10 and 9? 60 and 9?

**33.** 15 and 9? 55 and 9? 55 and 6? 75 and 9? 75 and 7? 64 and 9? 63 and 8? 13 and 8? 18 and 8? 78 and 8? 93 and 8? 95 and 8?

**34.** 97 and 7? 99 and 5? 98 and 7? 99 and 7? 96 and 7? 92 and 9? 74 and 6? 14 and 6? 96 and 6?

**35.** 95 and 7? 15 and 7? 89 and 7? 92 and 7? 7 and 14? 7 and 28? 8 and 36? 9 and 44? 8 and 53? 7 and 63? 8 and 84?

## No. 6

**1.** A farmer had 56 acres of land and bought 9 more. How many acres had he then?

2. A man bought a sofa and a rocking-chair, paying $17 for the sofa and $8 for the rocking-chair. How much did he pay for both?

3. If I buy a bookcase and a revolving chair, paying $28 for the bookcase and $8 for the chair, how much do I pay for both?

4. A lady buys a dress for $24 and a hat for $8. What is her bill?

5. There are 38 pupils in a schoolroom and 9 more are promoted to this room. How many pupils are now in the room?

6. A father is 25 years older than his son and the son is 9 years old. How old is the father?

7. I have $37 after paying a bill of $7. How much money had I before I paid the bill?

8. Henry had 15 pigeons after selling 8. How many pigeons had he before he sold the 8 pigeons?

9. Mary has 25¢ and her brother has 9¢. How many cents have both?

10. A lady buys a dinner set costing $16 and a kitchen safe costing $7. What is the amount of her bill?

11. A man buys 3 sheep for $18, and afterward buys 2 more for $9. How much do the 5 sheep cost?

12. John and Henry went fishing; John caught 19 fish and Henry caught 9. How many did both catch?

13. A boy pays 75¢ for a ball and 9¢ for three oranges. How many cents does he pay for the ball and the oranges?

14. There are 25 examples on one page of a book and 9 on another. How many examples are on the two pages?

## No. 7

1. Count by 1's to 100, beginning with 0.
2. Count by 2's to 100, beginning with 0.
3. Count by 2's to 100, beginning with 1.
4. Count by 3's to 100, beginning with 0.
5. Count by 3's to 100, beginning with 1.
6. Count by 3's to 100, beginning with 2.
7. Count by 4's to 100, beginning with 0.
8. Count by 4's to 100, beginning with 1.
9. Count by 4's to 100, beginning with 2.
10. Count by 4's to 100, beginning with 3.
11. Count by 5's to 100, beginning with 0.
12. Count by 5's to 100, beginning with 1.
13. Count by 5's to 100, beginning with 2.
14. Count by 5's to 100, beginning with 3.
15. Count by 5's to 100, beginning with 4.
16. Count by 6's to 100, beginning with 0.
17. Count by 6's to 100, beginning with 1.
18. Count by 6's to 100, beginning with 2.

19. Count by 6's to 100, beginning with 3.
20. Count by 6's to 100, beginning with 4.
21. Count by 6's to 100, beginning with 5.
22. Count by 7's to 100, beginning with 0.
23. Count by 7's to 100, beginning with 1.
24. Count by 7's to 100, beginning with 2.
25. Count by 7's to 100, beginning with 3.
26. Count by 7's to 100, beginning with 4.
27. Count by 7's to 100, beginning with 5.
28. Count by 7's to 100, beginning with 6.
29. Count by 8's to 100, beginning with 0.
30. Count by 8's to 100, beginning with 1.
31. Count by 8's to 100, beginning with 2.
32. Count by 8's to 100, beginning with 3.
33. Count by 8's to 100, beginning with 4.
34. Count by 8's to 100, beginning with 5.
35. Count by 8's to 100, beginning with 6.
36. Count by 8's to 100, beginning with 7.
37. Count by 9's to 100, beginning with 0.
38. Count by 9's to 100, beginning with 1.
39. Count by 9's to 100, beginning with 2.
40. Count by 9's to 100, beginning with 3.
41. Count by 9's to 100, beginning with 4.
42. Count by 9's to 100, beginning with 5.

**43.** Count by 9's to 100, beginning with 6.

**44.** Count by 9's to 100, beginning with 7.

**45.** Count by 9's to 100, beginning with 8.

**46.** Count by 10's to 100, beginning with 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

## No. 8

To the Teacher. Write on the blackboard several numbers, such as the following. Have one pupil add 4 to each of the numbers, another pupil add 7, another 9, and so on for each of the digits. When all of the digits are thus added, begin again. In every instance the sum only should be announced.

| | | |
|---|---|---|
| 14 | 28 | 17 |
| 19 | 16 | 34 |
| 75 | 84 | 23 |
| 52 | 61 | 79 |

## No. 9

### COMBINATIONS OF THREE FIGURES

Add:

**1.** 2, 3, 9; 1, 5, 9; 2, 3, 7; 3, 4, 8; 4, 6, 8; 5, 6, 9; 7, 8, 9.

**2.** 9, 9, 9; 6, 7, 9; 4, 5, 7; 2, 5, 6; 1, 4, 9; 1, 3, 7; 3, 5, 6; 4, 6, 7.

**3.** 2, 5, 8; 1, 7, 9; 8, 8, 8; 6, 6, 9; 4, 9, 4; 5, 7, 5; 6, 7, 8; 3, 7, 8.

**4.** 2, 7, 9; 7, 7, 7; 9, 4, 9; 8, 4, 8; 6, 6, 4; 3, 5, 9; 1, 2, 3; 3, 1, 4.

**5.** 3, 4, 6; 5, 4, 3; 6, 6, 6; 9, 9, 3; 7, 7, 3; 5, 3, 5; 4, 8, 9; 1, 2, 4.

**6.** 2, 4, 6; 1, 2, 9; 5, 7, 8; 5, 8, 9; 4, 6, 9; 7, 7, 4; 6, 5, 6; 6, 6, 8.

**7.** 9, 9, 2; 5, 5, 5; 3, 6, 7; 4, 5, 8; 6, 8, 9; 9, 7, 5; 6, 8, 5; 5, 6, 7.

**8.** 9, 9, 1; 8, 1, 8; 8, 8, 2; 7, 5, 7; 7, 7, 9; 3, 6, 9; 4, 5, 6; 2, 6, 7.

**9.** 7, 5, 2; 2, 4, 9; 8, 4, 2; 7, 7, 6; 8, 6, 8; 9, 9, 6; 9, 5, 9; 9, 9, 8.

**10.** 4, 4, 4; 3, 1, 5; 1, 4, 5; 6, 5, 1; 4, 1, 7; 2, 3, 6; 7, 7, 2; 6, 2, 6.

**11.** 5, 4, 5; 5, 5, 6; 4, 8, 4; 3, 9, 3; 8, 8, 7; 9, 8, 8; 4, 7, 4; 3, 3, 7.

**12.** 2, 9, 2; 9, 9, 7; 3, 8, 3; 2, 2, 8; 2, 2, 7; 4, 4, 6; 4, 7, 9; 8, 7, 4.

**13.** 8, 3, 9; 1, 4, 6; 1, 5, 7; 8, 1, 7; 5, 1, 8; 1, 3, 9; 2, 2, 2; 4, 4, 5.

**14.** 3, 5, 3; 2, 2, 5; 8, 8, 3; 1, 2, 5; 1, 3, 6; 1, 2, 7; 8, 1, 4; 6, 1, 9.

**15.** 9, 8, 1; 2, 5, 9; 2, 6, 9; 9, 8, 2; 7, 5, 3; 5, 5, 2; 4, 4, 2; 3, 3, 2.

**16.** 2, 2, 3; 7, 7, 1; 6, 1, 6; 5, 5, 1; 1, 1, 1; 3, 7, 9; 2, 3, 4; 5, 3, 2.

**17.** 2, 4, 5; 1, 6, 8; 6, 7, 1; 2, 3, 8; 2, 7, 8; 8, 6, 2; 3, 4, 9; 8, 5, 3.

**18.** 4, 4, 1; 3, 6, 8; 3, 3, 1; 2, 2, 1; 6, 3, 6; 8, 8, 5; 3, 3, 6; 5, 9, 5.

**19.** 3, 4, 7; 1, 3, 8; 2, 7, 4; 4, 5, 9; 1, 1, 2; 1, 3, 1; 1, 1, 4; 5, 1, 1.

**20.** 1, 6, 1; 1, 1, 7; 1, 8, 1; 1, 1, 9; 6, 7, 6; 7, 8, 7; 4, 4, 3; 3, 3, 4; 2, 2, 4; 2, 6, 2; 5, 8, 5.

The above exercise includes all possible combinations of the digits taken three at a time. By rearranging the digits in each combination, 564 other exercises may be obtained.

## No. 10

**1.** There are 7 horses in one pasture, 9 in another, and 8 in another. How many horses are in the three pastures?

**2.** If there are 15 teachers in one school building, 9 in a second, and 9 in a third, how many teachers are in the three buildings?

**3.** A boy has 19 chickens, 8 ducks, and 5 turkeys. How many fowls has he?

4. A man buys a cow for $37 and two sheep for $7 each. How much do the three animals cost?

5. A farmer plants 25 acres in corn, 9 acres in wheat, and 5 acres in oats. How many acres does he plant?

6. A farmer buys three tracts of land containing, respectively, 57 acres, 9 acres, and 6 acres. How many acres are in the three tracts?

7. In the first-year class of a certain high school 36 students study bookkeeping, 8 study botany, and 10 study physical geography. How many pupils are in the class?

8. A boy spends 45¢ for a penknife, 8¢ for a pen, and 9¢ for a writing tablet. How many cents does he spend for the three articles?

9. How many letters are in the three words, Mississippi, Missouri, Ohio?

10. In one schoolroom there are 23 desks, in another there are 9, and in another there are 8. How many desks are in the three rooms?

11. A room is 16 feet by 12 feet. How many feet is the distance around the room?

12. Find the cost of 1 pound of tea and 2 pounds of meat, if the tea costs 65¢ and the meat 9¢ a pound.

13. A man travels by rail 65 miles, by boat 9 miles, and by carriage 8 miles. How many miles does he travel?

**14.** A boy goes hunting; he rides on the train 24 miles, he then takes a boat and rides down a bayou 5 miles, then walks 3 miles. How many miles does he go to reach his place of hunting?

**15.** Nine years ago a man was 64 years old. How old is he now?

**16.** A farmer has two meadows; one yields 18 tons of hay, the other 13 tons. How many tons of hay do both meadows yield?

**17.** A planter sells 27 bales of cotton at one time, 7 bales at another, and 9 bales at another. How many bales of cotton does he sell altogether?

**18.** A farmer mixes 18 pounds of corn, 9 pounds of oats, and 9 pounds of bran for feed for his horses. How many pounds are in the mixture?

**19.** At a certain country post office there were 17 letters mailed on Monday, 11 on Tuesday, and 9 on Wednesday. How many letters were mailed in the three days?

**20.** After spending $9, a man has $69 left. How much money had he before he spent the $9?

## SUBTRACTION

### No. 11

1. A man had 11 head of cattle and sold 3. How many had he left?

2. There are 19 teachers in a certain high school; of these 12 are men and the rest are women. How many women teachers are in this high school?

3. A room is 18 feet long and 12 feet wide. How many more feet are there in the length than in the width?

4. A lot contains 27 acres; 9 acres of this lot are planted in corn, and the remainder in cotton. How many acres are planted in cotton?

5. There are 28 books on one shelf, and 19 books on another shelf. How many more books are on the first shelf than on the second?

6. There are 37 pupils in a certain grade. If 9 are absent, how many are present?

7. There are 25 pupils in a fourth grade; of these 16 are girls. How many boys are in this grade?

8. A man buys two suits of clothes; for one he pays $23, for the other, $9. How much more does he pay for one suit than for the other?

9. A property owner has 28 houses. If he sells 9 houses, how many will he still own?

10. A boy earns $25 a month and spends $9. How much money does he save?

11. A boy has $67 in a bank. If he draws out $9, how many dollars will he then have in the bank?

12. There were 53 school desks in a room, and 7 were removed. How many desks remained in the room?

## No. 12

1. Take 2 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
2. Take 3 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
3. Take 4 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
4. Take 5 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
5. Take 6 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
6. Take 7 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
7. Take 8 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
8. Take 9 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
9. Take 2 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.
10. Take 3 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.
11. Take 4 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.
12. Take 5 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.
13. Take 6 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.
14. Take 7 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.

15. Take 8 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.
16. Take 9 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.
17. Take 2 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
18. Take 3 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
19. Take 4 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
20. Take 5 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
21. Take 6 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
22. Take 7 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
23. Take 8 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
24. Take 9 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
25. Take 4 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
26. Take 5 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
27. Take 6 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
28. Take 7 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
29. Take 8 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
30. Take 9 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
31. Take 5 from 14, 24, 34, 44, 54, 64, 74, 84, 94, 104.
32. Take 6 from 14, 24, 34, 44, 54, 64, 74, 84, 94, 104.
33. Take 7 from 14, 24, 34, 44, 54, 64, 74, 84, 94, 104.
34. Take 8 from 14, 24, 34, 44, 54, 64, 74, 84, 94, 104.
35. Take 9 from 14, 24, 34, 44, 54, 64, 74, 84, 94, 104.
36. Take 6 from 15, 25, 35, 45, 55, 65, 75, 85, 95, 105.
37. Take 7 from 15, 25, 35, 45, 55, 65, 75, 85, 95, 105.
38. Take 8 from 15, 25, 35, 45, 55, 65, 75, 85, 95, 105.

39. Take 9 from 15, 25, 35, 45, 55, 65, 75, 85, 95, 105.
40. Take 7 from 16, 26, 36, 46, 56, 66, 76, 86, 96, 106.
41. Take 8 from 16, 26, 36, 46, 56, 66, 76, 86, 96, 106.
42. Take 9 from 16, 26, 36, 46, 56, 66, 76, 86, 96, 106.
43. Take 8 from 17, 27, 37, 47, 57, 67, 77, 87, 97, 107.
44. Take 9 from 17, 27, 37, 47, 57, 67, 77, 87, 97, 107.
45. Take 9 from 18, 28, 38, 48, 58, 68, 78, 88, 98, 108.

## No. 13

1. Count backward from 100 by 1; by 2; by 3; by 4; by 5; by 6.

2. Count backward from 100 by 7; by 8; by 9; by 10.

Find the difference between:

1. 17 and 9; 28 and 7; 36 and 7; 45 and 7; 54 and 6.

2. 35 and 8; 75 and 6; 84 and 7; 92 and 9; 93 and 8; 94 and 6.

3. 32 and 7; 43 and 5; 61 and 7; 71 and 9; 91 and 6; 95 and 9.

4. 31 and 8; 42 and 6; 73 and 9; 81 and 5; 91 and 2; 94 and 8.

5. 34 and 7; 54 and 9; 65 and 8; 84 and 5; 95 and 6; 11 and 4.

6. 15 and 9; 18 and 9; 37 and 8; 66 and 7; 77 and 8; 33 and 6.

**7.** 44 and 9; 55 and 6; 66 and 8; 77 and 9; 93 and 5; 11 and 9.

**8.** 88 and 9; 85 and 9; 75 and 9: 72 and 7; 82 and 6; 81 and 9.

**9.** By how many does 14 exceed 9? 17 exceed 8? 25 exceed 7? 32 exceed 5? 41 exceed 9? 51 exceed 6? 62 exceed 8?

**10.** By how many does 11 exceed 3? 15 exceed 8? 19 exceed 11? 23 exceed 12? 28 exceed 9? 35 exceed 7? 37 exceed 8?

**11.** By how many does 19 exceed 13? 29 exceed 10? 31 exceed 11? 24 exceed 7? 43 exceed 8? 54 exceed 45? 67 exceed 59?

**12.** By how many does 71 exceed 62? 91 exceed 84? 92 exceed 85? 100 exceed 91? 35 exceed 28? 46 exceed 39? 53 exceed 49?

**13.** By how much does 94 exceed 87? 83 exceed 77? 75 exceed 66? 77 exceed 68? 88 exceed 79? 44 exceed 36? 33 exceed 26?

**14.** How many must be added to 11 to give 20?

**15.** How many must be added to 9 to give 18?

**16.** How many must be added to 19 to give 25?

**17.** How many must be added to 17 to give 24?

**18.** How many must be added to 29 to give 38?

**19.** How many must be added to 35 to give 44?

**20.** How many must be added to 55 to give 63?

**21.** How many must be added to 66 to give 74?

**22.** How many must be added to 57 to give 66?

**23.** How many must be added to 75 to give 82?

**24.** How many must be added to 95 to give 100?

**25.** How many must be added to 16 to give 25?

**26.** How many must be added to 21 to give 30?

How many must be added to:

**27.** 32 to give 40? 43 to give 50? 54 to give 60? 61 to give 70? 72 to give 80? 81 to give 90? 93 to give 100?

**28.** 12 to give 20? 24 to give 31? 9 to give 44? 8 to give 55? 9 to give 66? 8 to give 77? 5 to give 91? 4 to give 81?

What number must be taken from:

**29.** 9 to leave 4? 9 to leave 6? 8 to leave 0? 8 to leave 1? 7 to leave 0? 11 to leave 3? 11 to leave 7?

**30.** 11 to leave 11? 12 to leave 9? 12 to leave 5? 12 to leave 2? 12 to leave 1? 13 to leave 4? 13 to leave 6?

**31.** 13 to leave 10? 14 to leave 5? 14 to leave 9? 14 to leave 4? 14 to leave 1? 15 to leave 8? 15 to leave 5? 15 to leave 9?

**32.** 15 to leave 3? 16 to leave 6? 16 to leave 9? 16 to leave 5? 17 to leave 7? 17 to leave 13? 17 to leave 15? 17 to leave 8?

**33.** 18 to leave 9? to leave 5? to leave 8? to leave 12? to leave 3? to leave 1? to leave 11?

**34.** 19 to leave 9? to leave 13? to leave 15? to leave 17?

**35.** 20 to leave 10? to leave 12? to leave 14? to leave 16? to leave 18? to leave 9? to leave 11? to leave 7? to leave 5?

**36.** 25 to leave 22? to leave 19? to leave 17? to leave 15? to leave 18? to leave 9? to leave 8? to leave 6?

## No. 14

**1.** A man gives a twenty-dollar bill to a merchant to pay for a suit of clothes which cost $13. How much change does he get?

**2.** A boy earns $25 a month. He pays $16 a month for board. How much money has he left after paying his board bill?

**3.** A man travels 22 miles. If he travels 18 miles by stage, and walks the remainder of the distance, how many miles does he walk?

**4.** There are 62 oranges in a box. If 9 are taken out, how many will be left in the box?

**5.** A carpenter earns $21 in 6 days. How many more dollars must he earn to get $30?

**6.** A man is hired for 60 days on condition that for every day he works he gets one dollar, and for every day he is idle he has to pay $1 for his board. If he works 54 days, how much wages does he receive?

**7.** A boy has 17¢. How many more cents must he get to have a quarter of a dollar?

**8.** A farmer has 54 sheep. If he sells 47, how many will he then have?

**9.** The dimensions of a room are 32 feet by 21 feet. How many feet longer is the room one way than the other?

**10.** A city lot is 60 feet by 120 feet. How many more feet in the length of the lot than in its width?

**11.** There are 28 geese in two flocks. If one flock contains 15 geese, how many does the other contain?

**12.** A boy has 63¢. How many more cents does he need to pay for a straw hat which costs 75¢?

**13.** A man bought a farm containing 56 acres and sold 11 acres of it to a neighbor. How many acres of the farm did he have left?

**14.** There are 24 head of cattle in a field and 6 of these are milch cows. How many head of cattle will remain in the field when the cows are taken out?

**15.** In an orchard there are 75 trees; 64 of them bear fruit. How many of the trees are barren?

**16.** In an orchard there are 47 trees; 9 of them are peach trees and the remainder are apple trees. How many apple trees are in the orchard?

**17.** There are 43 bushels of oats in a bin. How many bushels will be in the bin after 29 bushels are taken out?

**18.** If there are 34 bushels of wheat in a bin and 18 bushels are taken out, how many bushels will remain in the bin?

**19.** In one schoolroom there are 44 desks and in another schoolroom there are 59 desks. How many more desks are in the second room than in the first?

**20.** Two boys had 50¢ between them. If one boy has 23¢, how many cents has the other boy?

**21.** The sum of two numbers is 30 and one of the numbers is 17. What is the other number?

**22.** James has $45 in bank, and Henry has $60 in bank. How many more dollars has Henry in bank than James?

**23.** A man travels by rail 50 miles; he then walks 4 miles. How many more miles will he have to travel in order to go 70 miles in all?

## MULTIPLICATION

### No. 15

1. A pair of shoes cost $3. At this rate, how much will 4 pairs cost?

2. A yard of lawn costs 5¢. What will 5 yards cost?

3. A dozen eggs cost 15¢. What will 2 dozen cost?

4. A pound of butter costs 25¢. What will 2 pounds cost? What will 3 pounds cost?

5. A boy walks at the rate of 3 miles an hour. At this rate how far will he go in 3 hours? In 4 hours?

6. A boy rides on a bicycle at the rate of 6 miles an hour. How far will he ride in 3 hours? In 4 hours?

7. A train runs at the rate of 30 miles an hour. How far will the train run in 3 hours? In 5 hours?

8. A pound of meat costs 12¢. What will 5 pounds cost? What will 7 pounds cost?

9. A pound of tea costs 50¢. What will 3 pounds cost? What will 5 pounds cost?

10. A cord of wood costs $5. What will 7 cords cost? What will 9 cords cost?

**11.** A pencil costs 5¢. What will a dozen pencils cost?

**12.** A pair of boots cost $4. What will 7 pairs cost?

**13.** A sheep costs $5. What will 11 sheep cost? What will 13 sheep cost?

**14.** A father is 3 times as old as his son. If the son is 15 years old, how old is the father?

## No. 16

THE MULTIPLICATION TABLE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

## No. 17

How many are :

**1.** 9 times 7? 7 times 9? 8 times 7? 7 times 8? 9 times 12? 12 times 9? 7 times 5? 5 times 7? 6 times 4? 4 times 6?

**2.** 5 times 9? 9 times 5? 5 times 11? 11 times 5? 8 times 5? 5 times 8? 3 times 6? 6 times 3? 8 times 3? 3 times 8?

**3.** 6 times 7? 7 times 6? 6 times 9? 9 times 6? 9 times 9? 11 times 2? 2 times 11? 13 times 2? 2 times 13?

**4.** 8 times 4? 4 times 8? 9 times 4? 4 times 9? 10 times 4? 4 times 10? 12 times 4? 4 times 12? 8 times 6? 6 times 8?

**5.** 7 times 7? 8 times 9? 9 times 8? 11 times 7? 7 times 11? 5 times 11? 11 times 5? 3 times 5? 5 times 3?

**6.** 4 times 5? 5 times 4? 4 times 7? 7 times 4? 4 times 12? 12 times 4? 5 times 12? 12 times 5? 8 times 12? 12 times 8?

**7.** 10 times 9? 9 times 10? 10 times 7? 7 times 10? 10 times 11? 11 times 10? 12 times 10? 10 times 12? 12 times 9?

**8.** 9 times 12? 12 times 12? 12 times 13? 12 times 20? 12 times 19? 12 times 18? 12 times 15? 12 times 16?

**9.** 11 times 11? 11 times 13? 11 times 15? 11 times 17? 11 times 14? 11 times 16? 11 times 19? 11 times 20?

**10.** 4 times 60? 4 times 80? 4 times 90? 4 times 70? 4 times 50?

**11.** 6 times 40? 6 times 60? 6 times 80? 6 times 70? 6 times 30?

**12.** 9 times 20? 9 times 40? 9 times 60? 9 times 70? 9 times 90?

**13.** 8 times 20? 8 times 50? 8 times 70? 8 times 90? 8 times 30?

**14.** 7 times 30? 7 times 40? 7 times 60? 7 times 80? 7 times 90?

**15.** 5 times 20? 5 times 50? 5 times 60? 5 times 70? 5 times 90?

## No. 18

**1.** $7\times6+4=?$

This means 7 times 6, and 4, which is 46.

**2.** $8\times5+6=?$
**3.** $8\times7+6=?$
**4.** $6\times9+5=?$
**5.** $6\times8+2=?$
**6.** $7\times7+6=?$
**7.** $8\times9+4=?$
**8.** $9\times9+8=?$
**9.** $9\times7+7=?$
**10.** $6\times9+3=?$
**11.** $8\times8+5=?$
**12.** $8\times4+6=?$
**13.** $8\times3+7=?$
**14.** $6\times6+4=?$
**15.** $6\times3+5=?$
**16.** $5\times9+4=?$
**17.** $5\times5+3=?$
**18.** $9\times5+5=?$
**19.** $9\times6+6=?$
**20.** $9\times7+7=?$
**21.** $8\times7+4=?$
**22.** $8\times8+2=?$
**23.** $8\times9+7=?$
**24.** $8\times2+7=?$
**25.** $7\times2+6=?$

26. $7\times 4+4=?$
27. $7\times 5+1=?$
28. $9\times 2+6=?$
29. $9\times 4+5=?$
30. $8\times 7+7=?$
31. $7\times 9+3=?$
32. $7\times 3+6=?$
33. $7\times 7+3=?$
34. $4\times 6+3=?$
35. $3\times 8+2=?$
36. $3\times 5+2=?$
37. $3\times 9+2=?$
38. $3\times 8+1=?$
39. $4\times 11+2=?$
40. $4\times 12+2=?$
41. $6\times 12+2=?$
42. $6\times 7+2=?$
43. $2\times 9+1=?$
44. $2\times 7+1=?$
45. $2\times 6+1=?$
46. $2\times 12+1=?$
47. $3\times 12+1=?$
48. $1\times 1=?$
49. $2\times 2=?$
50. $3\times 3=?$
51. $4\times 4=?$
52. $5\times 5=?$
53. $6\times 6=?$
54. $7\times 7=?$
55. $8\times 8=?$
56. $9\times 9=?$
57. $10\times 10=?$
58. $11\times 11=?$
59. $12\times 12=?$
60. $13\times 13=?$
61. $14\times 14=?$
62. $15\times 15=?$
63. $16\times 16=?$
64. $17\times 17=?$
65. $18\times 18=?$
66. $19\times 19=?$
67. $20\times 20=?$
68. $30\times 30=?$
69. $40\times 40=?$
70. $50\times 50=?$

## No. 19

Multiply by 4 :

1. 3, 5, 9, 7, 11, 12, 6, 4, 8, 13, 15.

Multiply by 5 :

2. 12, 10, 8, 6, 4, 3, 5, 7, 9, 14, 13, 16.

Multiply by 6 :

3. 7, 10, 12, 11, 13, 9, 8, 5, 4, 3, 15, 14.

Multiply by 7 :

4. 3, 5, 7, 9, 11, 13, 15, 17, 19, 14, 12.

Multiply by 8 :

5. 2, 4, 6, 8, 10, 12, 14, 16, 15, 13, 11, 9.

Multiply by 9 :

6. 2, 5, 7, 9, 11, 13, 15, 14, 12, 10, 8, 6.

Multiply by 10 :

7. 6, 8, 10, 11, 12, 14, 16, 18, 19, 20, 17, 13.

Multiply by 11 :

8. 3, 5, 7, 9, 11, 13, 15, 14, 12, 10, 8, 6, 4.

Multiply by 12 :

9. 4, 6, 8, 10, 13, 15, 14, 12, 7, 5, 3.

10. Multiply each of the numbers from 1 to 20, by 3.

11. Multiply each of the numbers from 12 to 30, in succession by 2. The cube of a number is the result obtained by taking the number three times as a factor. Thus, the cube of 6 is $6 \times 6 \times 6 = 216$.

12. Cube each of the numbers from 1 to 12 in succession.

13. Square each of the numbers from 1 to 20. (To square a number is to multiply the number by itself.)

# DIVISION

## No. 20

1. If one orange costs 3¢, how many oranges can be bought for 15¢?

2. If one pencil costs 4¢, how many pencils can be bought for 20¢?

3. If one sheep costs $6, how many sheep can be bought for $24?

4. How many times are 3 inches contained in 12 inches?

5. Eight pounds of sugar cost 32¢. Find the cost of 1 pound.

6. Six tons of coal cost $42. Find the cost of 1 ton.

7. When 7 pairs of shoes cost $48, find the cost of 1 pair.

8. Two pounds of tea cost 50¢. Find the price of 1 pound.

9. A father gives his son $\frac{1}{4}$ of a farm containing 320 acres. How many acres does he give his son?

10. If 3 pounds of coffee cost 90¢, what will 1 pound cost?

**11.** Six head of cattle are sold for $180. Find the price of each.

**12.** Seven cords of wood cost $35. Find the cost of 1 cord.

**13.** There are 32 quarts in 1 bushel. How many quarts are in $\frac{1}{4}$ of a bushel? In $\frac{1}{8}$ of a bushel?

**14.** How many inches are in $\frac{1}{12}$ of a yard? In $\frac{1}{3}$ of of a yard? In $\frac{1}{4}$ of a yard? In $\frac{1}{6}$ of a yard? In $\frac{1}{9}$ of a yard? In $\frac{1}{2}$ of a yard?

**15.** How often is 12 inches contained in 1 yard?

**16.** How often is 4 inches contained in 1 yard?

**17.** How often is 9 inches contained in 1 yard?

**18.** How many hours are in $\frac{1}{2}$ of a day? In $\frac{1}{3}$ of a day? In $\frac{1}{4}$ of a day? In $\frac{1}{6}$ of a day? In $\frac{1}{8}$ of a day? In $\frac{1}{12}$ of a day?

**19.** How often is 8 hours contained in 1 day?

**20.** How often is 12 hours contained in 1 day?

**21.** How often is 6 hours contained in 1 day?

**22.** How often is 4 hours contained in 1 day?

**23.** How many minutes are in $\frac{1}{2}$ of an hour?

**24.** How many minutes are in $\frac{1}{3}$ of an hour? In $\frac{1}{4}$ of an hour? In $\frac{1}{5}$ of an hour? In $\frac{1}{6}$ of an hour? In $\frac{1}{8}$ of an hour? In $\frac{1}{10}$ of an hour? In $\frac{1}{12}$ of an hour? In $\frac{1}{20}$ of an hour?

**25.** How often is 15 minutes contained in 1 hour?

**26.** How often is 20 minutes contained in 1 hour?

27. How often is 30 minutes contained in 1 hour?

28. How often is 12 minutes contained in 1 hour?

29. How often is 10 minutes contained in 1 hour?

30. How often is 6 minutes contained in 1 hour?

31. How often is 4 minutes contained in 1 hour?

32. How often is 3 minutes contained in 1 hour?

33. How often is 2 minutes contained in 1 hour?

34. How often is 1 minute contained in 1 hour?

35. How often is $\frac{1}{2}$ of a minute contained in 1 hour?

36. How many months are in $\frac{1}{2}$ of a year? In $\frac{1}{3}$ of a year? In $\frac{1}{4}$ of a year? In $\frac{1}{6}$ of a year?

37. How often is 6 months contained in 1 year?

38. How often is 4 months contained in 1 year?

39. How often is 3 months contained in 1 year?

40. How often is 2 months contained in 1 year?

41. How often is 1 month contained in 1 year?

42. How many cents are in $\frac{1}{2}$ of a dollar?

43. How many cents are in $\frac{1}{4}$ of a dollar? In $\$\frac{1}{5}$? In $\$\frac{1}{10}$? $\$\frac{1}{20}$? $\$\frac{1}{25}$?

44. How often is 50 contained in \$1?

45. How often is 25¢ contained in \$1?

46. How often is 20¢ contained in \$1?

47. How often is 10¢ contained in \$1?

48. How often is 5¢ contained in \$1?

**49.** How often is 4¢ contained in $1?

**50.** How often is 2¢ contained in $1?

**51.** How often is 1¢ contained in $1?

**52.** There are 8 pints in 1 gallon. How many pints are in $\frac{1}{2}$ of a gallon?

**53.** How many pints are in $\frac{1}{4}$ of a gallon? In $\frac{1}{8}$ of a gallon?

**54.** How often is 4 pints contained in 1 gallon?

**55.** How often is 2 pints contained in 1 gallon?

**56.** How often is 1 pint contained in 1 gallon?

**57.** How often is $\frac{1}{2}$ of a pint contained in 1 gallon?

**58.** How often is $\frac{1}{4}$ of a pint contained in 1 gallon?

**59.** How many seconds are in $\frac{1}{2}$ of a minute? In $\frac{1}{3}$ of a minute? In $\frac{1}{4}$ of a minute? In $\frac{1}{5}$ of a minute? In $\frac{1}{6}$ of a minute? In $\frac{1}{10}$ of a minute? In $\frac{1}{12}$ of a minute? In $\frac{1}{15}$ of a minute?

**60.** How often is 30 seconds contained in 1 minute?

**61.** How often is 20 seconds contained in 1 minute?

**62.** How often is 15 seconds contained in 1 minute?

**63.** How often is 12 seconds contained in 1 minute?

**64.** How often is 10 seconds contained in 1 minute?

**65.** How often is 6 seconds contained in 1 minute?

**66.** How often is 5 seconds contained in 1 minute?

**67.** How often is 4 seconds contained in 1 minute?

**68.** How often is 3 seconds contained in 1 minute?

**69.** How often is 2 seconds contained in 1 minute?

## No. 21

| How many: | What is: |
|---|---|
| 1. 4's are in 12? | $\frac{1}{3}$ of 12? |
| 2. 4's are in 20? | $\frac{1}{5}$ of 20? |
| 3. 4's are in 32? | $\frac{1}{8}$ of 32? |
| 4. 4's are in 40? | $\frac{1}{10}$ of 40? |
| 5. 5's are in 15? | $\frac{1}{3}$ of 15? |
| 6. 5's are in 30? | $\frac{1}{6}$ of 30? |
| 7. 5's are in 45? | $\frac{1}{9}$ of 45? |
| 8. 6's are in 12? | $\frac{1}{2}$ of 12? |
| 9. 6's are in 18? | $\frac{1}{3}$ of 18? |
| 10. 6's are in 36? | $\frac{1}{6}$ of 36? |
| 11. 6's are in 48? | $\frac{1}{8}$ of 48? |
| 12. 6's are in 66? | $\frac{1}{11}$ of 66? |
| 13. 6's are in 72? | $\frac{1}{12}$ of 72? |
| 14. 7's are in 28? | $\frac{1}{4}$ of 28? |
| 15. 7's are in 42? | $\frac{1}{6}$ of 42? |
| 16. 7's are in 63? | $\frac{1}{9}$ of 63? |
| 17. 7's are in 84? | $\frac{1}{12}$ of 84? |
| 18. 8's are in 32? | $\frac{1}{4}$ of 32? |
| 19. 8's are in 48? | $\frac{1}{6}$ of 48? |
| 20. 8's are in 64? | $\frac{1}{8}$ of 64? |
| 21. 8's are in 80? | $\frac{1}{10}$ of 80? |
| 22. 9's are in 36? | $\frac{1}{4}$ of 36? |
| 23. 9's are in 45? | $\frac{1}{5}$ of 45? |

| | | |
|---|---|---|
| **24.** | 9's are in 72? | $\frac{1}{8}$ of 72? |
| **25.** | 9's are in 81? | $\frac{1}{9}$ of 81? |
| **26.** | 9's are in 96? | $\frac{1}{12}$ of 96? |
| **27.** | 10's are in 30? | $\frac{1}{3}$ of 30? |
| **28.** | 10's are in 50? | $\frac{1}{5}$ of 50? |
| **29.** | 10's are in 70? | $\frac{1}{7}$ of 70? |
| **30.** | 10's are in 100? | $\frac{1}{10}$ of 100? |
| **31.** | 10's are in 120? | $\frac{1}{12}$ of 120? |
| **32.** | 10's are in 200? | $\frac{1}{20}$ of 200? |
| **33.** | 11's are in 33? | $\frac{1}{3}$ of 33? |
| **34.** | 11's are in 55? | $\frac{1}{5}$ of 55? |
| **35.** | 11's are in 88? | $\frac{1}{8}$ of 88? |
| **36.** | 11's are in 110? | $\frac{1}{11}$ of 110? |
| **37.** | 11's are in 121? | $\frac{1}{11}$ of 121? |
| **38.** | 11's are in 132? | $\frac{1}{12}$ of 132? |
| **39.** | 12's are in 24? | $\frac{1}{2}$ of 24? |
| **40.** | 12's are in 48? | $\frac{1}{4}$ of 48? |
| **41.** | 12's are in 60? | $\frac{1}{5}$ of 60? |
| **42.** | 12's are in 84? | $\frac{1}{7}$ of 84? |
| **43.** | 12's are in 96? | $\frac{1}{8}$ of 96? |
| **44.** | 12's are in 120? | $\frac{1}{10}$ of 120? |
| **45.** | 12's are in 132? | $\frac{1}{11}$ of 132? |
| **46.** | 12's are in 144? | $\frac{1}{12}$ of 144? |
| **47.** | 3's are in 18? | $\frac{1}{6}$ of 18? |
| **48.** | 3's are in 27? | $\frac{1}{9}$ of 27? |

| | | |
|---|---|---|
| **49.** | 3's are in 36? | $\frac{1}{12}$ of 36? |
| **50.** | 2's are in 18? | $\frac{1}{9}$ of 18? |
| **51.** | 2's are in 24? | $\frac{1}{12}$ of 24? |

## No. 22

Divide 17 by 5. *Ans.* $3\frac{2}{5}$.

Divide by 2:

**1.** 5, 7, 8, 11, 13, 15, 17, 21, 24, 25, 29, 30, 32, 36.

Divide by 3:

**2.** 7, 11, 15, 19, 23, 29, 34, 38, 42, 45, 36.

Divide by 4:

**3.** 5, 8, 11, 14, 17, 20, 25, 28, 31, 37, 35, 44, 49.

Divide by 5:

**4.** 9, 12, 15, 19, 23, 27, 31, 34, 38, 42, 46, 51, 64.

Divide by 6:

**5.** 11, 16, 21, 26, 31, 38, 43, 48, 58, 62, 69, 72, 77.

Divide by 7:

**6.** 13, 19, 26, 33, 39, 45, 52, 58, 64, 69, 75, 83, 89.

Divide by 8:

**7.** 11, 18, 25, 32, 39, 46, 53, 60, 67, 74, 81, 90, 95.

Divide by 9:

**8.** 13, 21, 29, 37, 45, 53, 61, 69, 78, 86, 94, 102, 110, 115.

Divide by 10:

9. 23, 34, 45, 52, 61, 73, 83, 97, 106, 59, 65, 75, 115, 125.

Divide by 11:

10. 14, 22, 30, 38, 46, 53, 60, 67, 74, 81, 87, 93, 101, 109, 111.

Divide by 12:

11. 19, 26, 33, 40, 47, 54, 61, 68, 75, 82, 90, 98, 106, 114, 125.

Divide by 9:

12. 18, 28, 33, 38, 43, 48, 53, 58, 64, 69, 77, 84, 91, 98, 104.

## No. 23

| | | |
|---|---|---|
| 1. | $19 \div 6 = ?$ | $\frac{1}{6}$ of $25 = ?$ |
| 2. | $36 \div 6 = ?$ | $\frac{1}{6}$ of $41 = ?$ |
| 3. | $51 \div 6 = ?$ | $\frac{1}{6}$ of $47 = ?$ |
| 4. | $59 \div 6 = ?$ | $\frac{1}{6}$ of $35 = ?$ |
| 5. | $74 \div 6 = ?$ | $\frac{1}{6}$ of $58 = ?$ |
| 6. | $32 \div 6 = ?$ | $\frac{1}{6}$ of $39 = ?$ |
| 7. | $29 \div 7 = ?$ | $\frac{1}{7}$ of $23 = ?$ |
| 8. | $38 \div 7 = ?$ | $\frac{1}{7}$ of $27 = ?$ |
| 9. | $46 \div 7 = ?$ | $\frac{1}{7}$ of $34 = ?$ |
| 10. | $53 \div 7 = ?$ | $\frac{1}{7}$ of $59 = ?$ |
| 11. | $65 \div 7 = ?$ | $\frac{1}{7}$ of $74 = ?$ |
| 12. | $51 \div 7 = ?$ | $\frac{1}{7}$ of $45 = ?$ |
| 13. | $81 \div 7 = ?$ | $\frac{1}{7}$ of $25 = ?$ |

| | | |
|---|---|---|
| **14.** | $19 \div 8 = ?$ | $\frac{1}{8}$ of $28 = ?$ |
| **15.** | $27 \div 8 = ?$ | $\frac{1}{8}$ of $46 = ?$ |
| **16.** | $61 \div 8 = ?$ | $\frac{1}{8}$ of $54 = ?$ |
| **17.** | $38 \div 8 = ?$ | $\frac{1}{8}$ of $22 = ?$ |
| **18.** | $81 \div 8 = ?$ | $\frac{1}{8}$ of $75 = ?$ |
| **19.** | $79 \div 8 = ?$ | $\frac{1}{8}$ of $69 = ?$ |
| **20.** | $39 \div 8 = ?$ | $\frac{1}{8}$ of $29 = ?$ |
| **21.** | $22 \div 9 = ?$ | $\frac{1}{9}$ of $89 = ?$ |
| **22.** | $26 \div 9 = ?$ | $\frac{1}{9}$ of $80 = ?$ |
| **23.** | $33 \div 9 = ?$ | $\frac{1}{9}$ of $77 = ?$ |
| **24.** | $41 \div 9 = ?$ | $\frac{1}{9}$ of $70 = ?$ |

## No. 24

1. If $\frac{1}{2}$ of a number is 7, what is the number?
2. If $\frac{1}{2}$ of a number is 9, what is the number?
3. If $\frac{1}{2}$ of a number is 12, what is the number?
4. If $\frac{1}{2}$ of a number is 15, what is the number?
5. If $\frac{1}{2}$ of a number is $1\frac{1}{2}$, what is the number?
6. If $\frac{1}{2}$ of a number is $3\frac{1}{2}$, what is the number?
7. If $\frac{1}{2}$ of a number is $8\frac{1}{2}$, what is the number?
8. If $\frac{1}{2}$ of a number is $10\frac{1}{2}$, what is the number?
9. If $\frac{1}{2}$ of a number is $13\frac{1}{2}$, what is the number?
10. If $\frac{1}{3}$ of a number is 3, what is the number?
11. If $\frac{1}{3}$ of a number is 7, what is the number?
12. If $\frac{1}{3}$ of a number is 9, what is the number?

13. If $\frac{1}{3}$ of a number is 12, what is the number?
14. If $\frac{1}{3}$ of a number is $2\frac{1}{3}$, what is the number?
15. If $\frac{1}{3}$ of a number is $5\frac{1}{3}$, what is the number?
16. If $\frac{1}{3}$ of a number is $6\frac{2}{3}$, what is the number?
17. If $\frac{1}{3}$ of a number is $8\frac{2}{3}$, what is the number?
18. If $\frac{1}{3}$ of a number is $11\frac{1}{3}$, what is the number?
19. If $\frac{1}{3}$ of a number is $13\frac{1}{3}$, what is the number?
20. If $\frac{1}{4}$ of a number is 3, what is the number?
21. If $\frac{1}{4}$ of a number is 5, what is the number?
22. If $\frac{1}{4}$ of a number is 9, what is the number?
23. If $\frac{1}{4}$ of a number is 11, what is the number?
24. If $\frac{1}{4}$ of a number is 13, what is the number?
25. If $\frac{1}{4}$ of a number is $1\frac{1}{4}$, what is the number?
26. If $\frac{1}{4}$ of a number is $2\frac{3}{4}$, what is the number?
27. If $\frac{1}{4}$ of a number is $5\frac{1}{4}$, what is the number?
28. If $\frac{1}{4}$ of a number is $6\frac{3}{4}$, what is the number?
29. If $\frac{1}{4}$ of a number is $7\frac{1}{4}$, what is the number?
30. If $\frac{1}{4}$ of a number is $11\frac{3}{4}$, what is the number?
31. If $\frac{1}{4}$ of a number is $2\frac{1}{2}$, what is the number?
32. If $\frac{1}{4}$ of a number is $4\frac{1}{2}$, what is the number?
33. If $\frac{1}{4}$ of a number is $7\frac{1}{2}$, what is the number?
34. If $\frac{1}{4}$ of a number is $9\frac{1}{2}$, what is the number?
35. If $\frac{1}{4}$ of a number is $12\frac{1}{2}$, what is the number?
36. If $\frac{1}{5}$ of a number is 2, what is the number?
37. If $\frac{1}{5}$ of a number is 6, what is the number?

38. If $\frac{1}{5}$ of a number is 9, what is the number?
39. If $\frac{1}{5}$ of a number is 12, what is the number?
40. If $\frac{1}{5}$ of a number is 15, what is the number?
41. If $\frac{1}{5}$ of a number is 20, what is the number?
42. If $\frac{1}{5}$ of a number is $1\frac{3}{5}$, what is the number?
43. If $\frac{1}{5}$ of a number is $2\frac{2}{5}$, what is the number?
44. If $\frac{1}{5}$ of a number is $3\frac{3}{5}$, what is the number?
45. If $\frac{1}{5}$ of a number is $5\frac{4}{5}$, what is the number?
46. If $\frac{1}{5}$ of a number is $8\frac{1}{5}$, what is the number?
47. If $\frac{1}{5}$ of a number is $9\frac{2}{5}$, what is the number?
48. If $\frac{1}{5}$ of a number is $11\frac{4}{5}$, what is the number?
49. If $\frac{1}{6}$ of a number is 3, what is the number?
50. If $\frac{1}{6}$ of a number is 5, what is the number?
51. If $\frac{1}{6}$ of a number is 8, what is the number?
52. If $\frac{1}{6}$ of a number is 11, what is the number?
53. If $\frac{1}{6}$ of a number is 15, what is the number?
54. If $\frac{1}{6}$ of a number is $1\frac{5}{6}$, what is the number?
55. If $\frac{1}{6}$ of a number is $3\frac{1}{6}$, what is the number?
56. If $\frac{1}{6}$ of a number is $7\frac{1}{6}$, what is the number?
57. If $\frac{1}{6}$ of a number is $8\frac{5}{6}$, what is the number?
58. If $\frac{1}{6}$ of a number is $10\frac{5}{6}$, what is the number?
59. If $\frac{1}{6}$ of a number is $1\frac{1}{2}$, what is the number?
60. If $\frac{1}{6}$ of a number is $3\frac{1}{2}$, what is the number?
61. If $\frac{1}{6}$ of a number is $5\frac{1}{2}$, what is the number?

**62.** If $\frac{1}{6}$ of a number is $6\frac{1}{2}$, what is the number?

**63.** If $\frac{1}{6}$ of a number is $2\frac{1}{3}$, what is the number?

**64.** If $\frac{1}{6}$ of a number is $4\frac{1}{3}$, what is the number?

**65.** If $\frac{1}{6}$ of a number is $9\frac{1}{3}$, what is the number?

**66.** If $\frac{1}{6}$ of a number is $12\frac{1}{3}$, what is the number?

What number divided by 7 gives as quotient:

**67.** 3? 6? 9? 11? 12? 14? 10? 15? $2\frac{1}{7}$? $3\frac{4}{7}$? $5\frac{3}{7}$? $8\frac{2}{7}$?

What number divided by 8 gives as quotient:

**68.** 2? 4? 6? 9? 11? 13? 15? 12? 10? 8? 16? $2\frac{1}{8}$? $4\frac{1}{8}$? $7\frac{1}{8}$? $11\frac{1}{8}$?

What number divided by 8 gives as quotient:

**69.** $1\frac{1}{2}$? $3\frac{1}{2}$? $5\frac{1}{2}$? $8\frac{1}{2}$? $6\frac{1}{2}$? $7\frac{1}{2}$? $9\frac{1}{2}$? $12\frac{1}{2}$?

What number divided by 8 gives as quotient:

**70.** $1\frac{1}{4}$? $2\frac{1}{4}$? $4\frac{1}{4}$? $6\frac{1}{4}$? $7\frac{1}{4}$? $8\frac{1}{4}$? $10\frac{1}{4}$? $12\frac{1}{4}$?

What number divided by 9 gives as quotient:

**71.** 9? 7? 6? 4? 3? 1? 8? 10? 12? 13? 15? 20?

What number divided by 9 gives as quotient:

**72.** $3\frac{1}{9}$? $5\frac{4}{9}$? $4\frac{8}{9}$? $6\frac{1}{9}$? $7\frac{4}{9}$? $8\frac{8}{9}$? $10\frac{4}{9}$?

What number divided by 9 gives as quotient:

**73.** $1\frac{1}{3}$? $3\frac{1}{3}$? $4\frac{1}{3}$? $7\frac{1}{3}$? $9\frac{1}{3}$? $10\frac{1}{3}$? $12\frac{1}{3}$?

What number divided by 10 gives as quotient:

**74.** 5? 9? 11? 13? 15? 20? 30? 40? 45? 50? 60? 75?

What number divided by 10 gives as quotient:

**75.** $2\frac{1}{10}$? $3\frac{7}{10}$? $4\frac{9}{10}$? $5\frac{1}{10}$? $7\frac{7}{10}$? $8\frac{3}{10}$? $9\frac{9}{10}$?

What number divided by 10 gives as quotient:

**76.** $2\frac{1}{5}$? $5\frac{1}{5}$? $7\frac{1}{5}$? $9\frac{1}{5}$? $8\frac{1}{5}$? $11\frac{1}{5}$? $12\frac{1}{5}$?

What number divided by 10 gives as quotient:

**77.** $1\frac{1}{2}$? $3\frac{1}{2}$? $5\frac{1}{2}$? $8\frac{1}{2}$? $9\frac{1}{2}$? $10\frac{1}{2}$? $12\frac{1}{2}$? $15\frac{1}{2}$?

What number divided by 11 gives as quotient:

**78.** 5? 8? 9? 11? 12? 13? 15? 17? 20? 23? 25?

What number divided by 11 gives as quotient:

**79.** $1\frac{1}{11}$? $1\frac{9}{11}$? $3\frac{1}{11}$? $3\frac{5}{11}$? $3\frac{7}{11}$? $3\frac{8}{11}$? $4\frac{9}{11}$?

What number divided by 12 gives as quotient:

**80.** 3? 5? 8? 11? 14? 16? 18? 20? 22? 25? 30? 40? 45?

What number divided by 12 gives as quotient:

**81.** $1\frac{1}{12}$? $1\frac{5}{12}$? $2\frac{11}{12}$? $4\frac{1}{12}$? $5\frac{5}{12}$? $6\frac{11}{12}$? $7\frac{1}{12}$?

What number divided by 12 gives as quotient:

**82.** $1\frac{1}{2}$? $2\frac{1}{2}$? $4\frac{1}{2}$? $6\frac{1}{2}$? $9\frac{1}{2}$? $11\frac{1}{2}$? $13\frac{1}{2}$? $15\frac{1}{2}$?

What number divided by 12 gives as quotient:

**83.** $1\frac{1}{3}$? $3\frac{1}{3}$? $5\frac{1}{3}$? $8\frac{1}{3}$? $10\frac{1}{3}$? $12\frac{1}{3}$? $16\frac{1}{3}$?

What number divided by 12 gives as quotient:

**84.** $2\frac{1}{4}$? $4\frac{1}{4}$? $6\frac{1}{4}$? $8\frac{1}{4}$? $10\frac{1}{4}$? $12\frac{1}{4}$? $14\frac{1}{4}$?

What number divided by 12 gives as quotient:

**85.** $1\frac{1}{6}$? $3\frac{1}{6}$? $5\frac{1}{6}$? $7\frac{1}{6}$? $9\frac{1}{6}$? $11\frac{1}{6}$? $13\frac{1}{6}$? $15\frac{1}{6}$?

## No. 25

1. Six acres of land were sold for $150. Find the price per acre. What would 9 acres of this land cost?

2. Nine head of cattle were sold for $324. Find the price per head. What would 10 head of cattle cost at the same price per head?

3. Five rugs were bought for $85. Find the price of 1 rug. Find the price of 6 rugs at the same rate.

4. A train goes 174 miles in 6 hours. Find its rate, in miles, per hour.

How many miles will a train run in 5 hours at this rate?

5. A train runs 259 miles in 7 hours. Find its rate, in miles, per hour.

How far will a train run in 3 hours at this rate?

6. A wheel revolves 189 times in 63 seconds. How many times does it revolve in 1 second? How many revolutions will it make in 11 seconds?

7. Ninety-six cents is divided equally among 4 boys. How many cents does each boy get?

8. Four horses were sold for $256. Find the average price per horse.

If 7 such horses are sold, how much will they bring?

9. A tract of 584 acres is divided equally among 4 persons. How many acres does each person get?

**10.** In a school there are 198 pupils and 6 teachers. What is the average number of pupils to each teacher?

**11.** Twelve persons subscribe $180, each contributing the same amount. How much does each contribute? How much do 5 persons contribute?

**12.** A steamboat travels 65 miles in 5 hours. Find its rate, in miles, per hour.

At this rate how far will a steamboat go in 7 hours?

**13.** Two men row a boat 17 miles in 3 hours. Find the rate of rowing, in miles, per hour.

**14.** A man dying left $\frac{1}{2}$ of his property to his widow and $\frac{1}{2}$ of the remainder to each of his two sons. If his property is valued at $1,000, find the share of the widow and of a son.

**15.** A bookcase has 5 shelves. If there are 115 books in the case, find the average number of books on each shelf.

**16.** Six pictures were bought for $102. Find the price of each picture. Find the price of 5 such pictures.

**17.** Three statues cost $195. Find the price of 1 statue. Find the price of 4 statues.

**18.** Thirteen tons of coal are sold for $91. Find the price of 1 ton of coal. Find the price of 6 tons.

**19.** Eleven acres of land are sold for $385. Find the price per acre. Find the price of 6 acres.

**20.** In a box there are 240 eggs. How many dozen eggs are in the box?

**21.** An orchard contains 288 trees. If there are 12 rows of trees, and the same number of trees in each row, how many trees are in 1 row?

**22.** Telegraph poles are 50 yards apart. How many poles are in a distance of 400 yards?

**23.** When 6 buggies sell for $900, what is the price of 1 buggy? What is the price of 5 buggies?

**24.** How many lots of 9 acres each are in a tract of land containing 216 acres?

**25.** If 1 man does a piece of work in 12 days, how long will it take 2 men to do the same work?

**26.** If 1 team can plow a lot in 16 days, how long will it take 2 teams to plow the lot? How long will it take 3 teams? How long will it take 4 teams?

**27.** If 1 team can plow a field in 20 days, how long will it take 2 teams to plow the same field? How long will it take 4 teams? How long will it take 5 teams?

**28.** If 1 pipe can fill a cistern in 12 hours, how long will it take 2 such pipes to fill the same cistern? How long will it take 3 pipes to fill the same cistern? How long will it take 4 pipes to fill the same cistern?

**29.** If 4 men do a piece of work in 12 days, how long will it take 1 man to do the same work? How

long will it take 2 men to do the same work? How long will it take 3 men to do the same work?

**30.** Five teams can plow a field in 4 days. In what time could 1 team plow the same field? In what time could 2 teams plow the field? In what time could 3 teams plow the field? In what time could 4 teams plow the field?

**31.** Six masons build a wall in 5 days. In what time could 1 mason build the same wall? In what time could 2 masons build the same wall? In what time could 3 masons build the same wall? In what time could 4 masons build the same wall?

**32.** If 3 pipes fill a cistern in 4 hours, in what time would 1 pipe fill it? In what time would 2 pipes fill it?

**33.** Four men can chop 5 cords of wood in 1 day. How long will it take 2 men to chop 5 cords of wood?

# UNITED STATES MONEY

## No. 26

10 mills (m.) = 1 cent (¢)
10 cents = 1 dime
10 dimes = 1 dollar ($)
10 dollars = 1 eagle

1. How many cents are in 1 dime? In 2 dimes? In 3 dimes? In 5 dimes? In 8 dimes? In 10 dimes? In 20 dimes? In 25 dimes?

2. How many dimes are in $1? In $2? In $3? In $4? In $8? In $10?

3. How many cents are in $\frac{1}{2}$ dime? In $\frac{1}{5}$ of a dime?

4. How many dimes are in $\frac{1}{2}$ of a dollar? In $\frac{1}{5}$ of a dollar?

5. How many cents are in $1? In $2? In $5? In $7? In $10? In $9?

6. How many cents are in $\frac{1}{2}$ of a dollar? In $\frac{1}{4}$ of a dollar? In $\frac{1}{5}$ of a dollar? In $\frac{1}{10}$ of a dollar? In $\frac{1}{20}$ of a dollar?

7. How many cents are in $1.50? In $3.50? In $5.50? In $8.50?

8. How many cents are in $1.25? In $2.25? In $5.25? In $8.25?

9. How many cents are in 1 dollar and 1 dime? In 3 dollars and 2 dimes? In 4 dollars and 4 dimes? In 7 dollars and 9 dimes?

10. How many cents are in $1.10? $1.20? $6.70? $7.80?

11. How many cents are in $1.15? $3.24? $7.83?

12. How do you reduce dollars and cents to cents?

13. How many dollars are in 200 cents? 500 cents? 700 cents?

14. How many dollars are in 215 cents? 475 cents? 983 cents?

15. How do you reduce cents to dollars?

## No. 27

1. A grammar costs 35¢ and a mental arithmetic costs 25¢. What do both books cost?

2. A dozen eggs cost 25¢. What will 3 dozen cost?

3. A pound of butter costs 23¢. What will 5 pounds cost?

4. If a man buys 7 pounds of meat at 12¢ a pound, how much change should he get if he gives a dollar in payment?

5. A lady buys 4 yards of muslin at 15¢ a yard. If she gives in payment 3 quarter dollars, how much change should she get?

6. A boy buys a straw hat for 30¢. If he has $\frac{1}{2}$ of a dollar, how much money will he have after paying for the hat?

7. A newsboy buys 20 newspapers at 3¢ each and sells them for 5¢ each. How much profit does he make?

8. A bookseller buys 20 mental arithmetics at 20¢ each and sells them at 25¢ each. How much profit does he make?

9. A book is bought for 85¢ and sold for $1. Find the gain. Find the gain on 3 books. On 10 books.

10. A bookseller pays 45¢ for a geography and sells it for 50¢. What is his gain? If he sells 60 geographies, find his gain.

11. A furniture dealer buys matting at 30¢ a yard and sells it at 40¢ a yard. Find his gain on 40 yards of matting.

12. A boy has 55¢. How many more cents must he get in order to have $1?

13. A dealer buys 20 head of cattle at $27 a head and sells them at $30 a head. How much does he gain by the transaction?

14. When wheat sells for 79¢ a bushel, how much will 5 bushels of wheat bring? 7 bushels? 9 bushels? 12 bushels?

15. The price of barley is 48¢ a bushel. Find the cost of 5 bushels; 9 bushels; 10 bushels; 6 bushels; 12 bushels; 8 bushels.

**16.** If 1 bushel of oats costs 29¢, what will 7 bushels cost? 8 bushels?

**17.** When cotton sells for 8¢ a pound, find the value of a round bale of cotton weighing 200 pounds. Find the value of a square bale weighing 450 pounds.

**18.** When cotton sells for 7¢ a pound, how much will a bale of cotton weighing 490 pounds bring?

**19.** Find the cost of a 12-pound ham at 17¢ a pound.

**20.** Find the cost of 15 pounds of meat at 12¢ a pound.

**21.** A barrel of sugar costs $14.50. Find the cost of 2 barrels of sugar. Find the cost of 3 barrels of sugar. Find the cost of 5 barrels of sugar.

**22.** A barrel of flour costs $5.50. Find the cost of 3 barrels of flour. Find the cost of 5 barrels of flour.

**23.** Find the value of 4 tons of hay at $12.50 a ton. Find the value of 7 tons of hay at the same price.

**24.** I sell 2 horses at $87.50 each. What do I receive for both horses?

**25.** An acre of pasture land rents for 74¢. How much rent will you pay for 20 acres of pasture land?

**26.** A trader buys 10 horses at $85 each and sells them at $90 each. How much does he gain?

**27.** A carpenter receives 40¢ an hour and he works 8 hours a day. Find his wages for 5 days. For 10 days. For 2 weeks of 6 days each.

**28.** A laborer gets $1.50 a day. Find his wages for 8 days' work. For 12 days' work. For 16 days' work. For 20 days' work.

**29.** A brick mason receives $4.50 a day. How much will he get for 3 days' work? For 4 days' work? For 9 days' work? For 1 week's work? For 2 weeks' work of 6 days each? For 4 weeks' work of 6 days each?

**30.** A clerk earns $55 a month. At this rate what is his yearly salary? If he spends $350 a year and saves the remainder of his salary, how much does he save?

**31.** A man has $200 in bank. How much must he draw out so as to have $140 in bank?

**32.** Find the value of 3 barrels of apples at $1.75 a barrel. At $2.25 a barrel. At $2.50 a barrel. At $2.75 a barrel. At $2.90 a barrel.

**33.** Find the value of 4 boxes of oranges at $2.75 a box. At $2.50 a box. At $2.25 a box. At $1.90 a box.

**34.** A dozen eggs cost 28¢. Find the cost of 9 dozen. 7 dozen.

**35.** A pound of butter costs 21¢. Find the cost of a firkin of butter containing 20 pounds.

**36.** Find the value of 50 pounds of cherries at 7¢ a pound.

**37.** A boy picks 73 pounds of cherries. If he gets 2¢ a pound for picking the cherries, how much does he receive?

**38.** When strawberries sell at 11¢ a box, what will eighteen boxes cost?

**39.** Find the cost of 5 gallons of molasses at 75¢ a gallon. 9 gallons at 80¢ a gallon. 11 gallons at 85¢ a gallon.

**40.** Find the cost of 12 packages of oatmeal at 15¢ a package.

**41.** A man buys 7 head of cattle at $35 a head; one of the cattle dies, and he sells the remainder at $40 a head. Does he gain, or lose, and how much?

## No. 28

**1.** At 3¢ apiece, how many oranges can be bought for 48¢?

**2.** At 4¢ apiece, how many pencils can be bought for $1?

**3.** How many lambs can be bought for $10 at $2.50 apiece?

**4.** When apples cost 3¢ each, how many can I buy for 50¢? How much change should I get after buying the greatest possible number?

5. How many gallons of kerosene oil at 18¢ a gallon can be bought for $1.70? What change should be returned to you after buying as many gallons as possible for this amount of money?

6. If I pay $4 for a sack of pecans, when the price of pecans is 8¢ a pound, how many pounds of pecans are in the sack?

7. A box of oranges costs $1.50. At this rate, how many boxes can be bought for $15? For $24? For $30?

8. How many boxes of oranges can be bought for $20.25, if the price of 1 box is $2.25?

9. Geographies cost 50¢ apiece. How many pupils are in a grade, if the geographies for the grade cost $21?

10. A volume in a set of Dickens' works costs $1.50. How many volumes are in the set, if the set cost $22.50?

11. Wilson's History of the United States, in 5 volumes, costs $17.50. What is the price per volume?

12. How many books at 90¢ each can be bought for $14.40?

13. The price of chickens, per dozen, is $2.50. How many dozen can be bought for $27.50? What is the price of a chicken at this rate?

14. A tract of land is sold for $4,800 at $40 an acre. How many acres are in the tract?

**15.** Five head of cattle are sold for $256.50. What is the price per head?

**16.** Eleven sheep are sold for $60.50. What is the price per head?

**17.** If I can buy 15 copies of a book for $12, what is the price of the book per copy?

**18.** How many 2¢ stamps can I buy for $2.50?

**19.** How many 3¢ stamps can I buy for $2.97?

**20.** How many 5¢ stamps can I buy for $4.25?

**21.** How many 8¢ stamps can I buy for $3?

**22.** How many 15¢ stamps can be bought for $1.65?

**23.** How many head of cattle at $35 a head can be bought for $315?

**24.** How many bushels of oats at 30¢ a bushel must be exchanged for a ton of coal at $6 a ton?

**25.** How many bushels of wheat at 80¢ a bushel will it take to pay for $1\frac{1}{2}$ cords of wood at $4 a cord?

**26.** How many bushels of wheat at 80¢ a bushel will pay for $1\frac{1}{2}$ tons of hay at $12 a ton?

**27.** How many bushels of barley at 40¢ a bushel will pay for a horse which costs $84?

**28.** When turkeys sell for $1.25 apiece, how many turkeys must be sold to buy a dining-room set which costs $50?

**29.** Thirty turkeys are sold for $45. What is the average price per turkey?

30. A dozen chickens are sold for $4.20. What is the price of 1 chicken? What is the price of 5 chickens?

31. When I can buy 2 apples for 5¢, how many apples can I buy for 25¢?

32. When 3 oranges cost 10¢, how many oranges can I buy for $1?

33. If 2 melons cost a quarter of a dollar, how many melons can be bought for $1.25?

## RECKONING CHANGE

### No. 29

1. From $5 take $1.25.

SOLUTION. $1.25 + $.75 = $2. $2 + $3 = $5.
*Ans.* $3.75.

2. From $ 3 take $1.25.
3. From $ 4 take $1.75.
4. From $ 5 take $1.50.
5. From $10 take $3.50.
6. From $10 take $2.75.
7. From $10 take $4.75.
8. From $ 5 take $1.75.
9. From $ 5 take $3.85.
10. From $ 5 take $4.65.
11. From $ 5 take $3.95.
12. From $10 take $7.20.
13. From $10 take $4.60.
14. From $10 take $8.30.
15. From $10 take $5.80.

1. From $5 take $2.34.

SOLUTION. $2.34 + $.06 = $2.40. $2.40 + $.60 = $3. $3 + $2 = $5. *Ans.* $2.66.

Counting forward 6¢ from $2.34, we have $2.40. Counting forward 60¢ more, we have $3. Counting $2 more, we have $5. Altogether we have counted 6¢ + 60¢ + $2.

2. From $ 4 take $1.19.
3. From $ 3 take $1.27.
4. From $ 5 take $2.74.
5. From $ 5 take $1.38.
6. From $ 5 take $3.84.
7. From $10 take $4.83.
8. From $10 take $5.55.
9. From $10 take $8.17.
10. From $ 5 take $1.04.
11. From $ 4 take $3.18.
12. From $ 3 take $2.08.
13. From $10 take $ 2.63.
14. From $10 take $ 3.65.
15. From $20 take $11.35.
16. From $15 take $12.15.
17. From $15 take $11.65.
18. From $20 take $13.45.
19. From $20 take $17.20.
20. From $20 take $14.64.
21. From $15 take $10.42.
22. From $15 take $11.24.
23. From $20 take $ 3.15.

## MEASURES AND MULTIPLES

### No. 30

1. What are the prime factors of 21? 24? 12? 30? 50? 28?

2. What are the prime factors of 35? 55? 65? 85? 95? 15?

3. What are the prime factors of 77? 33? 22? 121? 143? 49?

4. What are the prime factors of 25? 36? 81? 75? 100? 120?

5. Name all the factors of 16, 20, 24, 28, 32, 36, 40, 42, 45.

6. Name all the factors of 15, 25, 35, 45, 60, 70, 80, 90, 96.

7. Name all the factors of 12, 18, 27, 33, 44, 66, 75, 78, 84.

#### GREATEST COMMON MEASURE

8. Find the greatest common measure of 6 and 12.

9. Find the greatest common measure of 6 and 9.

10. Find the greatest common measure of 8 and 12.

**11.** Find the greatest common measure of 10 and 15.

**12.** Find the greatest common measure of 12 and 20.

**13.** Find the greatest common measure of 15 and 20.

**14.** Find the greatest common measure of 16 and 20.

**15.** Find the greatest common measure of 14 and 21.

**16.** Find the greatest common measure of 16 and 24.

**17.** Find the greatest common measure of 18 and 27.

**18.** Find the greatest common measure of 20 and 30.

**19.** Find the greatest common measure of 20 and 28.

**20.** Find the greatest common measure of 21 and 24.

**21.** Find the greatest common measure of 21 and 28.

**22.** Find the greatest common measure of 24 and 28.

Find G. C. M. of:

**23.** 22 and 33; 24 and 36; 24 and 32; 28 and 35; 8 and 28.

**24.** 12 and 28; 15 and 35; 16 and 36; 14 and 35; 16 and 36.

**25.** 20 and 36; 20 and 35; 28 and 36; 28 and 42; 28 and 70.

**26.** 24 and 42; 25 and 40; 30 and 45; 30 and 42; 30 and 48.

**27.** 36 and 48; 32 and 48; 33 and 48; 14 and 49; 21 and 49.

**28.** 28 and 49; 35 and 56; 32 and 56; 40 and 56; 50 and 56.

**29.** 50 and 40; 52 and 65; 52 and 78; 39 and 52; 24 and 56.

**30.** 24 and 60; 36 and 60; 40 and 60; 45 and 60; 50 and 60.

**31.** 54 and 63; 45 and 54; 35 and 63; 35 and 77; 22 and 55.

**32.** 44 and 77; 33 and 55; 36 and 84; 60 and 84; 60 and 72; 66 and 78.

**33.** 36 and 66; 42 and 63; 81 and 72; 81 and 63; 36 and 54; 54 and 72.

**34.** 54 and 81; 63 and 90; 70 and 84; 70 and 85; 75 and 84.

**35.** 78 and 84; 72 and 84; 66 and 84; 66 and 88; 66 and 77.

**36.** 65 and 78; 65 and 91; 78 and 91; 72 and 90; 78 and 90.

**37.** 69 and 92; 63 and 84; 70 and 90; 28 and 98; 42 and 98.

**38.** 70 and 98; 84 and 98; 55 and 100; 64 and 88; 32 and 80.

**39.** 32 and 88; 40 and 72; 56 and 96; 72 and 56; 100 and 80.

**40.** 100 and 60; 100 and 30; 50 and 75; 75 and 100; 75 and 95.

**41.** 22 and 99; 44 and 99; 45 and 99; 65 and 91; 85 and 34.

**42.** 85 and 51; 85 and 68; 95 and 57; 95 and 38; 46 and 115.

**43.** 69 and 115; 87 and 58; 62 and 93; 74 and 111; 105 and 84.

## LEAST COMMON MULTIPLE

### No. 31

**1.** Name the first 10 multiples of 2.
**2.** Name the first 12 multiples of 3.
**3.** Name the first 12 multiples of 4.
**4.** Name the first 12 multiples of 5.
**5.** Name the first 12 multiples of 6.
**6.** Name the first 12 multiples of 7.
**7.** Name the first 12 multiples of 8.
**8.** Name the first 12 multiples of 9.
**9.** Name the first 12 multiples of 10.
**10.** Name the first 12 multiples of 11.
**11.** Name the first 12 multiples of 12.
**12.** Name the first 12 multiples of 13.
**13.** Name the first 12 multiples of 14.
**14.** Name the first 12 multiples of 15.
**15.** Name the first 12 multiples of 16.
**16.** Name the first 12 multiples of 17.
**17.** Name the first 12 multiples of 18.
**18.** Name the first 12 multiples of 19.
**19.** Name the first 12 multiples of 20.

**20.** What is meant by a common multiple of two or more numbers?

**21.** What is meant by the least common multiple of two or more numbers?

**22.** Name 2 common multiples of 6 and 8.

**23.** Name 2 common multiples of 4 and 18.

**24.** Name 3 common multiples of 12 and 16.

**25.** Name 3 common multiples of 16 and 24.

The **Least Common Multiple of two numbers** equals the product of the numbers divided by their greatest common measure. Thus, the L. C. M. of 15 and 21 is $\frac{15 \times 21}{3} = 105$.

Name the L. C. M. of:

**26.** 9 and 12.
**27.** 6 and 8.
**28.** 8 and 12.
**29.** 9 and 15.
**30.** 12 and 16.
**31.** 4 and 10.
**32.** 8 and 10.
**33.** 8 and 14.
**34.** 9 and 15.
**35.** 7 and 14.
**36.** 14 and 21.
**37.** 12 and 18.
**38.** 16 and 24.
**39.** 18 and 27.
**40.** 6 and 10.
**41.** 10 and 15.
**42.** 11 and 22.
**43.** 14 and 28.
**44.** 18 and 24.
**45.** 15 and 20.
**46.** 15 and 25.
**47.** 20 and 30.
**48.** 20 and 25.
**49.** 22 and 33.
**50.** 14 and 35.
**51.** 18 and 36.
**52.** 18 and 54.
**53.** 26 and 39.
**54.** 21 and 28.
**55.** 21 and 35.
**56.** 24 and 36.
**57.** 15 and 18.
**58.** 20 and 24.
**59.** 27 and 36.
**60.** 30 and 40.
**61.** 32 and 48.

The Least Common Multiple of three numbers is found by first getting the L. C. M. of two of the numbers, and then the L. C. M. of this result and the third number.

Name the L. C. M. of:

1. 3, 6, and 9.
2. 4, 7, and 8.
3. 5, 10, and 15.
4. 5, 10, and 6.
5. 6, 9, and 10.
6. 6, 8, and 9.
7. 8, 12, and 16.
8. 10, 15, and 20.
9. 5, 8, and 15.
10. 6, 12, and 18.
11. 9, 12, and 18.
12. 12, 18, and 24.
13. 3, 4, and 5.
14. 4, 5, and 6.
15. 6, 8, and 9.
16. 9, 10, and 15.
17. 9, 15, and 18.
18. 16, 20, and 40.
19. 9, 15, and 24.
20. 10, 12, and 20.
21. 10, 15, and 30.
22. 8, 18, and 24.
23. 14, 21, and 28.
24. 16, 24, and 32.
25. 14, 21, and 42.
26. 24, 48, and 12.
27. 35, 15, and 7.
28. 15, 24, and 40.
29. 30, 12, and 40.
30. 14, 16, and 56.
31. 10, 14, and 35.
32. 36, 90, and 60.
33. 18, 30, and 45.
34. 15, 16, and 18.
35. 44, 11, and 33.
36. 15, 20, and 25.

## TESTS OF DIVISIBILITY

### No. 32

A number is exactly divisible by 2 when its units' digit is exactly divisible by 2. Thus, 174 is exactly divisible by 2 since its units' digit, 4, is exactly divisible by 2.

A number is exactly divisible by 5 if its units' figure is 5 or 0. Thus, 225 is divisible by 5 because its units' figure is 5. 380 is divisible by 5 because its units' figure is 0.

A number is exactly divisible by 4 when the number formed by its two right-hand figures, taken in order, is exactly divisible by 4. Thus, 736 is divisible by 4 because 36 is exactly divisible by 4.

A number is exactly divisible by 25 when the number formed by its two right-hand digits is exactly divisible by 25. Thus, 275 is exactly divisible by 25 because 75 is exactly divisible by 25.

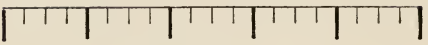
A number is exactly divisible by 11 when the difference between the sums of the digits in the even places and the odd places of the number is 0, or a multiple of 11. Thus, 1,287 is exactly divisible by 11 because the difference between 8 plus 1 and 7 plus 2 is 0.

A number is exactly divisible by 8 when the number formed by its three right-hand digits is exactly divisible by 8. Thus, 9,128 is exactly divisible by 8 because 128 is divisible by 8.

The same rule holds for 125.

## FRACTIONS

### No. 33



How many fifths are in 1? How many twentieths are in 1?

How many twentieths are in $\frac{1}{5}$? How many twentieths are in $\frac{2}{5}$?

How many twentieths are in $\frac{3}{5}$? How many twentieths are in $\frac{4}{5}$?

$\frac{3}{5}$ equals what fraction having 20 for its denominator?

Reduce:

1. $\frac{2}{3}$ to a fraction having 12 for denominator.

SOLUTION. $\frac{2}{3} = \frac{\text{Some number}}{12}$.

**If the terms of a fraction are multiplied by the same number, the value of the fraction remains unchanged.**

Since 12 is 4 times 3, if we multiply the terms of the fraction $\frac{2}{3}$ by 4 we get the fraction $\frac{8}{12}$. Therefore, $\frac{2}{3} = \frac{8}{12}$.

2. $\frac{1}{2}$ to 6ths, 10ths, 12ths, 20ths, 24ths, 18ths.
3. $\frac{2}{3}$ to 6ths, 9ths, 15ths, 18ths, 24ths, 30ths.
4. $\frac{3}{4}$ to 8ths, 12ths, 16ths, 24ths, 28ths, 36ths.
5. $\frac{2}{5}$ to 10ths, 15ths, 20ths, 25ths, 35ths, 45ths.

6. $\frac{5}{6}$ to 12ths, 24ths, 30ths, 36ths, 48ths, 60ths.
7. $\frac{3}{8}$ to 16ths, 24ths, 32ds, 40ths, 48ths, 64ths.
8. $\frac{5}{9}$ to 18ths, 27ths, 36ths, 45ths, 63ds, 72ds.
9. $\frac{3}{10}$ to 20ths, 30ths, 40ths, 60ths, 80ths, 90ths.
10. $\frac{5}{12}$ to 24ths, 36ths, 48ths, 60ths, 84ths, 96ths.
11. $\frac{7}{15}$ to 30ths, 45ths, 60ths, 75ths, 90ths, 105ths.

## No. 34

Reduce to lowest terms:

1. $\frac{4}{8}$.
2. $\frac{6}{12}$.
3. $\frac{3}{12}$.
4. $\frac{8}{12}$.
5. $\frac{9}{12}$.
6. $\frac{10}{12}$.
7. $\frac{6}{8}$.
8. $\frac{8}{10}$.
9. $\frac{6}{10}$.
10. $\frac{5}{15}$.
11. $\frac{10}{15}$.
12. $\frac{8}{16}$.
13. $\frac{6}{16}$.
14. $\frac{12}{16}$.
15. $\frac{14}{16}$.
16. $\frac{3}{18}$.
17. $\frac{6}{18}$.
18. $\frac{9}{18}$.
19. $\frac{12}{18}$.
20. $\frac{14}{18}$.
21. $\frac{16}{18}$.
22. $\frac{4}{20}$.
23. $\frac{5}{20}$.
24. $\frac{8}{20}$.
25. $\frac{10}{20}$.
26. $\frac{12}{20}$.
27. $\frac{14}{20}$.
28. $\frac{15}{20}$.
29. $\frac{16}{20}$.
30. $\frac{18}{20}$.
31. $\frac{2}{24}$.
32. $\frac{3}{24}$.
33. $\frac{4}{24}$.
34. $\frac{6}{24}$.
35. $\frac{8}{24}$.
36. $\frac{10}{24}$.
37. $\frac{12}{24}$.
38. $\frac{16}{24}$.
39. $\frac{18}{24}$.
40. $\frac{20}{24}$.
41. $\frac{22}{24}$.
42. $\frac{5}{25}$.
43. $\frac{10}{25}$.
44. $\frac{15}{25}$.
45. $\frac{20}{25}$.
46. $\frac{4}{28}$.
47. $\frac{7}{28}$.
48. $\frac{12}{28}$.
49. $\frac{14}{28}$.
50. $\frac{16}{28}$.
51. $\frac{18}{28}$.
52. $\frac{20}{28}$.
53. $\frac{24}{28}$.
54. $\frac{8}{32}$.
55. $\frac{12}{32}$.
56. $\frac{16}{32}$.
57. $\frac{20}{32}$.
58. $\frac{24}{32}$.
59. $\frac{28}{32}$.
60. $\frac{30}{32}$.
61. $\frac{4}{36}$.
62. $\frac{6}{36}$.
63. $\frac{9}{36}$.
64. $\frac{12}{36}$.
65. $\frac{16}{36}$.
66. $\frac{15}{36}$.
67. $\frac{18}{36}$.
68. $\frac{20}{36}$.
69. $\frac{24}{36}$.
70. $\frac{28}{36}$.
71. $\frac{30}{36}$.
72. $\frac{33}{36}$.
73. $\frac{8}{40}$.
74. $\frac{12}{40}$.
75. $\frac{16}{40}$.

| | | | | |
|---|---|---|---|---|
| 76. $\frac{20}{40}$. | 85. $\frac{9}{45}$. | 94. $\frac{4}{48}$. | 103. $\frac{24}{48}$. | 112. $\frac{18}{63}$. |
| 77. $\frac{24}{40}$. | 86. $\frac{12}{45}$. | 95. $\frac{6}{48}$. | 104. $\frac{30}{48}$. | 113. $\frac{33}{77}$. |
| 78. $\frac{25}{40}$. | 87. $\frac{15}{45}$. | 96. $\frac{8}{48}$. | 105. $\frac{36}{48}$. | 114. $\frac{39}{91}$. |
| 79. $\frac{30}{40}$. | 88. $\frac{20}{45}$. | 97. $\frac{9}{48}$. | 106. $\frac{40}{48}$. | 115. $\frac{72}{108}$. |
| 80. $\frac{32}{40}$. | 89. $\frac{25}{45}$. | 98. $\frac{12}{48}$. | 107. $\frac{42}{48}$. | 116. $\frac{30}{75}$. |
| 81. $\frac{35}{40}$. | 90. $\frac{30}{45}$. | 99. $\frac{15}{48}$. | 108. $\frac{26}{39}$. | 117. $\frac{36}{54}$. |
| 82. $\frac{36}{40}$. | 91. $\frac{35}{45}$. | 100. $\frac{16}{48}$. | 109. $\frac{42}{63}$. | 118. $\frac{74}{111}$. |
| 83. $\frac{38}{40}$. | 92. $\frac{36}{45}$. | 101. $\frac{18}{48}$. | 110. $\frac{50}{75}$. | 119. $\frac{76}{114}$. |
| 84. $\frac{5}{45}$. | 93. $\frac{40}{45}$. | 102. $\frac{20}{48}$. | 111. $\frac{62}{93}$. | 120. $\frac{58}{87}$. |

## No. 35

Reduce $\frac{28}{8}$ to a mixed number.

$\frac{28}{8}$ may be read in two ways: 28 divided by 8, or 28 eighths. 28 divided by 8 equals $3\frac{4}{8}$, or $3\frac{1}{2}$.

Eight eighths equals 1. Therefore, 28 eighths equals as many 1's as 8 is contained in 28. Eight is contained in 28, $3\frac{4}{8}$ times, or $3\frac{1}{2}$ times.

Reduce each of the following fractions to a mixed number:

1. $\frac{3}{2}$, $\frac{7}{2}$, $\frac{9}{2}$, $\frac{17}{2}$, $\frac{27}{2}$, $\frac{33}{2}$, $\frac{39}{2}$, $\frac{41}{2}$, $\frac{53}{2}$, $\frac{61}{2}$, $\frac{67}{2}$.
2. $\frac{5}{3}$, $\frac{10}{3}$, $\frac{14}{3}$, $\frac{19}{3}$, $\frac{23}{3}$, $\frac{31}{3}$, $\frac{35}{3}$, $\frac{41}{3}$, $\frac{47}{3}$, $\frac{59}{3}$.
3. $\frac{6}{4}$, $\frac{9}{4}$, $\frac{14}{4}$, $\frac{18}{4}$, $\frac{21}{4}$, $\frac{27}{4}$, $\frac{31}{4}$, $\frac{39}{4}$, $\frac{45}{4}$, $\frac{51}{4}$.
4. $\frac{7}{5}$, $\frac{9}{5}$, $\frac{13}{5}$, $\frac{19}{5}$, $\frac{22}{5}$, $\frac{29}{5}$, $\frac{34}{5}$, $\frac{48}{5}$, $\frac{52}{5}$, $\frac{62}{5}$, $\frac{68}{5}$.
5. $\frac{9}{6}$, $\frac{13}{6}$, $\frac{17}{6}$, $\frac{21}{6}$, $\frac{25}{6}$, $\frac{34}{6}$, $\frac{39}{6}$, $\frac{43}{6}$, $\frac{51}{6}$, $\frac{57}{6}$, $\frac{69}{6}$.
6. $\frac{10}{7}$, $\frac{13}{7}$, $\frac{16}{7}$, $\frac{22}{7}$, $\frac{29}{7}$, $\frac{34}{7}$, $\frac{44}{7}$, $\frac{54}{7}$, $\frac{64}{7}$, $\frac{73}{7}$, $\frac{83}{7}$.

7. $\frac{11}{8}, \frac{18}{8}, \frac{25}{8}, \frac{33}{8}, \frac{41}{8}, \frac{52}{8}, \frac{62}{8}, \frac{78}{8}, \frac{84}{8}, \frac{92}{8}, \frac{100}{8}$.

8. $\frac{11}{9}, \frac{17}{9}, \frac{26}{9}, \frac{35}{9}, \frac{51}{9}, \frac{60}{9}, \frac{70}{9}, \frac{80}{9}, \frac{100}{9}, \frac{113}{9}, \frac{125}{9}$.

9. $\frac{15}{10}, \frac{25}{10}, \frac{35}{10}, \frac{42}{10}, \frac{48}{10}, \frac{58}{10}, \frac{64}{10}, \frac{112}{10}, \frac{144}{10}$.

10. $\frac{18}{12}, \frac{28}{12}, \frac{40}{12}, \frac{50}{12}, \frac{70}{12}, \frac{80}{12}, \frac{90}{12}, \frac{100}{12}, \frac{110}{12}$.

11. $\frac{24}{15}, \frac{35}{15}, \frac{40}{15}, \frac{50}{15}, \frac{65}{15}, \frac{72}{15}, \frac{81}{15}, \frac{93}{15}$.

12. $\frac{24}{16}, \frac{28}{16}, \frac{36}{16}, \frac{42}{16}, \frac{54}{16}, \frac{60}{16}, \frac{72}{16}, \frac{80}{16}, \frac{90}{16}$.

13. $\frac{27}{18}, \frac{30}{18}, \frac{40}{18}, \frac{50}{18}, \frac{60}{18}, \frac{64}{18}, \frac{76}{18}, \frac{80}{18}, \frac{84}{18}$.

14. $\frac{30}{20}, \frac{45}{20}, \frac{50}{20}, \frac{70}{20}, \frac{75}{20}, \frac{85}{20}, \frac{95}{20}, \frac{105}{20}, \frac{115}{20}$.

15. $\frac{30}{24}, \frac{36}{24}, \frac{42}{24}, \frac{54}{24}, \frac{60}{24}, \frac{75}{24}, \frac{80}{24}, \frac{90}{24}, \frac{100}{24}$.

16. $\frac{30}{25}, \frac{40}{25}, \frac{55}{25}, \frac{60}{25}, \frac{70}{25}, \frac{84}{25}, \frac{90}{25}, \frac{110}{25}, \frac{120}{25}$.

17. $\frac{19}{2}, \frac{25}{3}, \frac{42}{5}, \frac{35}{6}, \frac{30}{7}, \frac{44}{8}, \frac{53}{9}, \frac{74}{12}, \frac{17}{7}, \frac{19}{6}$.

## No. 36

Reduce $3\frac{5}{8}$ to an improper fraction.

SOLUTION. $1 = 8$ eighths.

Therefore, $3 = 24$ eighths.

Therefore, $3\frac{5}{8} = 29$ eighths. *Ans.* $\frac{29}{8}$.

Reduce each of the following mixed numbers to an improper fraction:

1. $2\frac{1}{2}$.
2. $3\frac{1}{4}$.
3. $4\frac{3}{4}$.
4. $7\frac{3}{4}$.
5. $11\frac{3}{4}$.
6. $15\frac{3}{4}$.
7. $17\frac{1}{4}$.
8. $2\frac{2}{5}$.
9. $3\frac{3}{5}$.
10. $5\frac{4}{5}$.
11. $7\frac{1}{5}$.
12. $9\frac{2}{5}$.
13. $14\frac{3}{5}$.
14. $16\frac{4}{5}$.
15. $8\frac{1}{3}$.
16. $9\frac{2}{3}$.
17. $13\frac{2}{3}$.
18. $17\frac{2}{3}$.
19. $19\frac{1}{3}$.
20. $23\frac{1}{3}$.

21. $1\frac{1}{6}$.
22. $3\frac{5}{6}$.
23. $5\frac{1}{6}$.
24. $8\frac{1}{6}$.
25. $12\frac{5}{6}$.
26. $13\frac{5}{5}$.
27. $16\frac{1}{6}$.
28. $17\frac{5}{6}$.
29. $2\frac{1}{7}$.
30. $2\frac{6}{7}$.
31. $3\frac{4}{7}$.
32. $5\frac{5}{7}$.
33. $7\frac{1}{7}$.
34. $8\frac{4}{7}$.
35. $10\frac{3}{7}$.
36. $14\frac{2}{7}$.
37. $1\frac{1}{8}$.
38. $1\frac{7}{8}$.
39. $2\frac{7}{8}$.
40. $3\frac{1}{8}$.
41. $4\frac{3}{8}$.
42. $5\frac{3}{8}$.
43. $7\frac{5}{8}$.
44. $9\frac{3}{8}$.
45. $11\frac{1}{8}$.
46. $12\frac{3}{8}$.
47. $13\frac{5}{8}$.
48. $15\frac{5}{8}$.
49. $16\frac{3}{8}$.
50. $1\frac{1}{9}$.
51. $2\frac{2}{9}$.
52. $5\frac{5}{9}$.
53. $7\frac{7}{9}$.
54. $8\frac{8}{9}$.
55. $11\frac{1}{9}$.
56. $12\frac{2}{9}$.
57. $13\frac{4}{9}$.
58. $15\frac{5}{9}$.
59. $5\frac{3}{10}$.
60. $4\frac{7}{10}$.
61. $6\frac{3}{10}$.
62. $9\frac{9}{10}$.
63. $20\frac{3}{10}$.
64. $1\frac{4}{11}$.
65. $2\frac{8}{11}$.
66. $3\frac{2}{11}$.
67. $8\frac{2}{11}$.
68. $5\frac{5}{11}$.
69. $4\frac{6}{11}$.
70. $6\frac{4}{11}$.
71. $7\frac{3}{11}$.
72. $3\frac{7}{11}$.
73. $1\frac{1}{12}$.
74. $3\frac{5}{12}$.
75. $4\frac{7}{12}$.
76. $7\frac{5}{12}$.
77. $8\frac{7}{12}$.
78. $9\frac{11}{12}$.
79. $3\frac{5}{16}$.
80. $4\frac{4}{15}$.
81. $7\frac{3}{17}$.
82. $8\frac{9}{14}$.
83. $9\frac{5}{13}$.
84. $8\frac{5}{18}$.

## No. 37

Reduce $\frac{2}{3}$, $\frac{5}{6}$, $\frac{3}{8}$ to fractions of the same denomination.

SOLUTION. Find a common multiple of 3, 6, and 8, preferably the least. The L. C. M. of 3, 6, 8 is 24.

$\frac{2}{3} = \frac{16}{24}$.

$\frac{5}{6} = \frac{20}{24}$.

$\frac{3}{8} = \frac{9}{24}$.

*Ans.* $\frac{16}{24}$, $\frac{20}{24}$, $\frac{9}{24}$.

Reduce to fractions of the same denomination:

1. $\frac{1}{3}, \frac{1}{2}, \frac{1}{6}$.
2. $\frac{1}{2}, \frac{2}{3}, \frac{7}{12}$.
3. $\frac{1}{3}, \frac{1}{6}, \frac{5}{12}$.
4. $\frac{1}{2}, \frac{4}{5}, \frac{3}{10}$.
5. $\frac{3}{5}, \frac{9}{10}, \frac{3}{4}$.
6. $\frac{1}{2}, \frac{3}{4}, \frac{7}{8}, \frac{5}{16}$.
7. $\frac{2}{3}, \frac{3}{5}, \frac{7}{15}$.
8. $\frac{3}{5}, \frac{3}{10}, \frac{5}{6}$.
9. $\frac{2}{5}, \frac{7}{10}, \frac{7}{15}$.
10. $\frac{3}{4}, \frac{7}{12}, \frac{3}{8}$.
11. $\frac{2}{3}, \frac{1}{6}, \frac{5}{8}$.
12. $\frac{1}{2}, \frac{9}{10}, \frac{1}{4}$.
13. $\frac{1}{3}, \frac{1}{4}, \frac{7}{12}$.
14. $\frac{3}{4}, \frac{5}{12}, \frac{7}{8}$.
15. $\frac{2}{3}, \frac{5}{6}, \frac{7}{10}$.
16. $\frac{1}{2}, \frac{5}{14}, \frac{1}{3}$.
17. $\frac{1}{4}, \frac{1}{9}, \frac{1}{12}$.
18. $\frac{1}{6}, \frac{11}{12}, \frac{1}{4}$.
19. $\frac{7}{12}, \frac{5}{18}, \frac{1}{2}$.
20. $\frac{1}{4}, \frac{11}{18}, \frac{7}{9}$.
21. $\frac{3}{8}, \frac{3}{5}, \frac{7}{10}$.

## ADDITION

### No. 38

Add $\frac{2}{3}, \frac{3}{8}, \frac{11}{12}$.

SOLUTION. $\frac{2}{3} = \frac{16}{24}$.

$\frac{3}{8} = \frac{9}{24}$.

$\frac{11}{12} = \frac{22}{24}$.

Therefore, $\frac{2}{3} + \frac{3}{8} + \frac{11}{12} = \frac{16}{24} + \frac{9}{24} + \frac{22}{24} = \frac{47}{24} = 1\frac{23}{24}$.

How do you add fractions of different denominations?

Add:

1. $\frac{1}{2}, \frac{3}{4}$.
2. $\frac{1}{2}, \frac{1}{3}$.
3. $\frac{1}{2}, \frac{2}{3}$.
4. $\frac{1}{3}, \frac{1}{4}$.
5. $\frac{1}{3}, \frac{3}{4}$.
6. $\frac{2}{3}, \frac{1}{4}$.
7. $\frac{1}{3}, \frac{1}{6}$.
8. $\frac{2}{3}, \frac{1}{6}$.
9. $\frac{1}{3}, \frac{5}{6}$.
10. $\frac{1}{2}, \frac{3}{8}$.
11. $\frac{1}{2}, \frac{5}{8}$.
12. $\frac{1}{2}, \frac{7}{8}$.
13. $\frac{1}{4}, \frac{1}{8}$.
14. $\frac{1}{4}, \frac{3}{8}$.
15. $\frac{1}{4}, \frac{7}{8}$.
16. $\frac{3}{4}, \frac{1}{8}$.
17. $\frac{3}{4}, \frac{3}{8}$.
18. $\frac{3}{4}, \frac{7}{8}$.
19. $\frac{1}{2}, \frac{1}{10}$.
20. $\frac{1}{2}, \frac{3}{10}$.
21. $\frac{1}{2}, \frac{7}{10}$.
22. $\frac{1}{2}, \frac{9}{10}$.
23. $\frac{1}{4}, \frac{1}{10}$.
24. $\frac{1}{4}, \frac{3}{10}$.

25. $\frac{1}{4}, \frac{7}{10}$.
26. $\frac{1}{4}, \frac{9}{10}$.
27. $\frac{1}{2}, \frac{1}{12}$.
28. $\frac{1}{2}, \frac{5}{12}$.
29. $\frac{1}{2}, \frac{7}{12}$.
30. $\frac{1}{2}, \frac{11}{12}$.
31. $\frac{1}{3}, \frac{1}{12}$.
32. $\frac{1}{3}, \frac{5}{12}$.
33. $\frac{1}{3}, \frac{7}{12}$.
34. $\frac{1}{3}, \frac{11}{12}$.
35. $\frac{2}{3}, \frac{1}{12}$.
36. $\frac{2}{3}, \frac{5}{12}$.
37. $\frac{2}{3}, \frac{7}{12}$.
38. $\frac{2}{3}, \frac{11}{12}$.
39. $\frac{1}{4}, \frac{1}{12}$.
40. $\frac{1}{4}, \frac{5}{12}$.
41. $\frac{1}{4}, \frac{7}{12}$.
42. $\frac{1}{4}, \frac{11}{12}$.
43. $\frac{3}{4}, \frac{1}{12}$.
44. $\frac{3}{4}, \frac{5}{12}$.
45. $\frac{3}{4}, \frac{7}{12}$.
46. $\frac{3}{4}, \frac{11}{12}$.
47. $\frac{1}{3}, \frac{1}{5}$.
48. $\frac{1}{3}, \frac{2}{5}$.
49. $\frac{1}{3}, \frac{3}{5}$.
50. $\frac{1}{3}, \frac{4}{5}$.
51. $\frac{2}{3}, \frac{1}{5}$.
52. $\frac{2}{3}, \frac{2}{5}$.
53. $\frac{2}{3}, \frac{3}{5}$.
54. $\frac{2}{3}, \frac{4}{5}$.
55. $\frac{1}{2}, \frac{5}{16}$.
56. $\frac{1}{2}, \frac{7}{16}$.
57. $\frac{1}{2}, \frac{11}{16}$.
58. $\frac{1}{2}, \frac{13}{16}$.
59. $\frac{1}{2}, \frac{15}{16}$.
60. $\frac{1}{4}, \frac{1}{16}$.
61. $\frac{1}{4}, \frac{5}{16}$.
62. $\frac{1}{4}, \frac{7}{16}$.
63. $\frac{1}{4}, \frac{9}{16}$.
64. $\frac{1}{4}, \frac{11}{16}$.
65. $\frac{1}{4}, \frac{13}{16}$.
66. $\frac{1}{4}, \frac{15}{16}$.
67. $\frac{3}{4}, \frac{1}{16}$.
68. $\frac{3}{4}, \frac{3}{16}$.
69. $\frac{3}{4}, \frac{5}{16}$.
70. $\frac{3}{4}, \frac{7}{16}$.
71. $\frac{3}{4}, \frac{9}{16}$.
72. $\frac{3}{4}, \frac{11}{16}$.
73. $\frac{3}{4}, \frac{13}{16}$.
74. $\frac{3}{4}, \frac{15}{16}$.
75. $\frac{1}{2}, \frac{1}{9}$.
76. $\frac{1}{2}, \frac{5}{9}$.
77. $\frac{1}{2}, \frac{2}{9}$.
78. $\frac{1}{2}, \frac{7}{9}$.
79. $\frac{1}{2}, \frac{8}{9}$.
80. $\frac{1}{4}, \frac{1}{5}$.
81. $\frac{1}{4}, \frac{2}{5}$.
82. $\frac{1}{4}, \frac{3}{5}$.
83. $\frac{1}{4}, \frac{4}{5}$.
84. $\frac{3}{4}, \frac{1}{5}$.
85. $\frac{3}{4}, \frac{2}{5}$.
86. $\frac{3}{4}, \frac{3}{5}$.
87. $\frac{3}{4}, \frac{4}{5}$.
88. $\frac{1}{4}, \frac{1}{10}$.
89. $\frac{1}{4}, \frac{3}{10}$.
90. $\frac{1}{4}, \frac{7}{10}$.
91. $\frac{1}{4}, \frac{9}{10}$.
92. $\frac{3}{4}, \frac{1}{10}$.
93. $\frac{3}{4}, \frac{3}{10}$.
94. $\frac{3}{4}, \frac{7}{10}$.
95. $\frac{3}{4}, \frac{9}{10}$.
96. $\frac{1}{3}, \frac{1}{8}$.
97. $\frac{1}{3}, \frac{3}{8}$.
98. $\frac{1}{3}, \frac{5}{8}$.
99. $\frac{1}{3}, \frac{7}{8}$.
100. $\frac{2}{3}, \frac{1}{8}$.
101. $\frac{2}{3}, \frac{7}{8}$.
102. $\frac{2}{3}, \frac{3}{8}$.
103. $\frac{2}{3}, \frac{5}{8}$.
104. $\frac{1}{6}, \frac{1}{8}$.
105. $\frac{1}{6}, \frac{3}{8}$.
106. $\frac{1}{6}, \frac{5}{8}$.
107. $\frac{1}{6}, \frac{7}{8}$.
108. $\frac{5}{6}, \frac{1}{8}$.
109. $\frac{5}{6}, \frac{3}{8}$.
110. $\frac{5}{6}, \frac{5}{8}$.
111. $\frac{5}{6}, \frac{7}{8}$.
112. $\frac{1}{8}, \frac{1}{12}$.
113. $\frac{1}{8}, \frac{5}{12}$.
114. $\frac{1}{8}, \frac{7}{12}$.
115. $\frac{1}{8}, \frac{11}{12}$.
116. $\frac{3}{8}, \frac{2}{5}$.

## No. 39

Add:

1. $1\frac{1}{2}$, $3\frac{1}{4}$.
2. $2\frac{1}{2}$, $1\frac{3}{4}$.
3. $1\frac{2}{3}$, $1\frac{1}{2}$.
4. $1\frac{3}{4}$, $1\frac{1}{3}$.
5. $2\frac{1}{2}$, $2\frac{2}{3}$.
6. $4\frac{1}{4}$, $1\frac{2}{3}$.
7. $2\frac{2}{3}$, $2\frac{3}{4}$.
8. $2\frac{4}{5}$, $1\frac{9}{10}$.
9. $2\frac{3}{5}$, $1\frac{7}{10}$.
10. $2\frac{1}{5}$, $2\frac{9}{10}$.
11. $1\frac{1}{2}$, $1\frac{5}{6}$.
12. $1\frac{2}{3}$, $1\frac{5}{6}$.
13. $1\frac{3}{4}$, $3\frac{5}{8}$.
14. $2\frac{3}{4}$, $2\frac{3}{8}$.
15. $2\frac{1}{2}$, $3\frac{7}{8}$.
16. $1\frac{5}{6}$, $1\frac{11}{12}$.
17. $2\frac{5}{6}$, $2\frac{7}{12}$.
18. $3\frac{5}{6}$, $3\frac{5}{12}$.

## SUBTRACTION

## No. 40

1. $2-\frac{1}{2}=?$
2. $3-\frac{3}{4}=?$
3. $4-\frac{2}{3}=?$
4. $5-\frac{1}{3}=?$
5. $6-\frac{1}{4}=?$
6. $6-\frac{1}{6}=?$
7. $7-\frac{5}{6}=?$
8. $8-\frac{3}{5}=?$
9. $10-\frac{4}{5}=?$
10. $7-\frac{1}{8}=?$
11. $8-\frac{3}{8}=?$
12. $10-\frac{5}{8}=?$
13. $11-\frac{7}{8}=?$
14. $3-\frac{1}{9}=?$
15. $4-\frac{2}{9}=?$
16. $5-\frac{5}{9}=?$
17. $7-\frac{7}{9}=?$
18. $9-\frac{1}{10}=?$
19. $3-\frac{3}{10}=?$
20. $4-\frac{7}{10}=?$
21. $9-\frac{9}{10}=?$
22. $1-\frac{1}{12}=?$
23. $2-\frac{5}{12}=?$
24. $3-\frac{7}{12}=?$

## No. 41

1. $\frac{1}{2}-\frac{1}{3}=?$
2. $\frac{2}{3}-\frac{1}{2}=?$
3. $\frac{1}{3}-\frac{1}{4}=?$
4. $\frac{3}{4}-\frac{2}{3}=?$
5. $\frac{5}{6}-\frac{1}{2}=?$
6. $\frac{5}{6}-\frac{1}{3}=?$
7. $\frac{5}{6}-\frac{1}{2}=?$
8. $\frac{5}{6}-\frac{2}{3}=?$
9. $\frac{5}{6}-\frac{1}{4}=?$

10. $\frac{5}{6}-\frac{3}{4}=?$
11. $\frac{1}{2}-\frac{1}{5}=?$
12. $\frac{1}{2}-\frac{2}{5}=?$
13. $\frac{3}{5}-\frac{1}{2}=?$
14. $\frac{4}{5}-\frac{1}{2}=?$
15. $\frac{4}{5}-\frac{3}{4}=?$
16. $\frac{3}{4}-\frac{3}{5}=?$
17. $\frac{4}{5}-\frac{3}{8}=?$
18. $\frac{7}{8}-\frac{1}{2}=?$
19. $\frac{7}{8}-\frac{1}{4}=?$
20. $\frac{7}{8}-\frac{3}{4}=?$
21. $\frac{5}{8}-\frac{1}{2}=?$
22. $\frac{3}{4}-\frac{5}{8}=?$
23. $\frac{7}{8}-\frac{3}{4}=?$
24. $\frac{1}{3}-\frac{1}{8}=?$
25. $\frac{3}{8}-\frac{1}{3}=?$
26. $\frac{5}{8}-\frac{1}{3}=?$
27. $\frac{7}{8}-\frac{1}{3}=?$
28. $\frac{2}{3}-\frac{5}{8}=?$
29. $\frac{7}{8}-\frac{2}{3}=?$
30. $\frac{1}{6}-\frac{1}{8}=?$
31. $\frac{5}{6}-\frac{1}{8}=?$
32. $\frac{5}{6}-\frac{3}{8}=?$
33. $\frac{5}{6}-\frac{5}{8}=?$
34. $\frac{3}{8}-\frac{1}{6}=?$
35. $\frac{5}{8}-\frac{1}{6}=?$
36. $\frac{7}{8}-\frac{1}{6}=?$
37. $\frac{7}{8}-\frac{5}{6}=?$
38. $\frac{1}{2}-\frac{1}{12}=?$
39. $\frac{1}{2}-\frac{5}{12}=?$
40. $\frac{7}{12}-\frac{1}{2}=?$
41. $\frac{11}{12}-\frac{1}{2}=?$
42. $\frac{1}{3}-\frac{1}{12}=?$
43. $\frac{5}{12}-\frac{1}{3}=?$
44. $\frac{7}{12}-\frac{1}{3}=?$
45. $\frac{2}{3}-\frac{7}{12}=?$
46. $\frac{11}{12}-\frac{1}{3}=?$
47. $\frac{11}{12}-\frac{2}{3}=?$
48. $\frac{11}{12}-\frac{1}{4}=?$
49. $\frac{11}{12}-\frac{3}{4}=?$
50. $\frac{9}{10}-\frac{3}{4}=?$
51. $\frac{7}{10}-\frac{1}{3}=?$

## No. 42

1. $1\frac{1}{2}-\frac{5}{6}=?$

SOLUTION. $1-\frac{5}{6}=\frac{1}{6}$.

Therefore, $1\frac{1}{2}-\frac{5}{6}=\frac{1}{2}+\frac{1}{6}=\frac{2}{3}$.

2. $1\frac{1}{2}-\frac{2}{3}=?$
3. $2\frac{1}{3}-\frac{1}{2}=?$
4. $3\frac{1}{4}-\frac{1}{2}=?$
5. $2\frac{1}{4}-1\frac{3}{4}=?$
6. $2\frac{1}{6}-1\frac{1}{3}=?$
7. $3\frac{1}{6}-1\frac{1}{2}=?$
8. $3\frac{5}{6}-\frac{3}{4}=?$
9. $2\frac{1}{6}-\frac{1}{4}=?$
10. $4\frac{1}{6}-\frac{3}{4}=?$
11. $3\frac{1}{2}-1\frac{5}{8}=?$
12. $4\frac{1}{2}-2\frac{7}{8}=?$
13. $4\frac{1}{4}-\frac{3}{8}=?$
14. $5\frac{1}{4}-1\frac{5}{8}=?$
15. $7\frac{1}{4}-2\frac{7}{8}=?$
16. $4\frac{3}{4}-2\frac{3}{8}=?$
17. $3\frac{3}{4}-1\frac{5}{8}=?$
18. $5\frac{3}{4}-2\frac{7}{8}=?$
19. $3\frac{1}{3}-\frac{5}{6}=?$

20. $1\frac{1}{5} - \frac{3}{10} = ?$
21. $2\frac{1}{5} - \frac{7}{10} = ?$
22. $4\frac{1}{5} - 1\frac{9}{10} = ?$
23. $3\frac{3}{10} - 1\frac{7}{10} = ?$
24. $4\frac{3}{10} - 1\frac{3}{5} = ?$
25. $6\frac{3}{10} - 5\frac{4}{5} = ?$
26. $2\frac{7}{10} - 1\frac{4}{5} = ?$
27. $2\frac{4}{5} - 1\frac{9}{10} = ?$
28. $2\frac{2}{5} - 1\frac{7}{10} = ?$
29. $1\frac{11}{12} - 1\frac{3}{4} = ?$
30. $1\frac{1}{12} - \frac{3}{4} = ?$
31. $5\frac{5}{12} - 2\frac{3}{4} = ?$

## No. 43

1. A coal dealer bought a quantity of coal. The first week he sold $\frac{1}{2}$ of it, the next week $\frac{1}{3}$ of it. What part of the coal remained unsold at the end of the second week?

2. A lot contains $3\frac{1}{4}$ acres. Two and one half acres of this lot are planted in cabbages, and the remainder in parsnips. How many acres are planted in parsnips?

3. There are $5\frac{1}{2}$ bushels of wheat in a bin. If $3\frac{3}{4}$ bushels are sold, how many bushels will remain in the bin?

4. A pile of wood contains $7\frac{1}{4}$ cords. If $3\frac{3}{4}$ cords are sold, how many cords will remain in the pile?

5. A boy has $\$1$. If he spends $\frac{1}{2}$ of a dollar and $\frac{1}{5}$ of a dollar, what fraction of a dollar will he then have?

6. A can contains 5 gallons of kerosene oil. If $2\frac{2}{5}$ gallons are drawn out, how many gallons will remain in the can?

7. What sum of money must be added to $\$1\frac{3}{5}$ to make $\$5$?

8. After making a purchase amounting to $\$3\frac{3}{5}$, I have $\$1\frac{1}{4}$ left. How much money had I at first?

**9.** What sum of money must be taken from $\$4\frac{1}{4}$ to leave $\$3\frac{3}{4}$?

**10.** A ranchman sold $\frac{1}{3}$ and $\frac{1}{4}$ of his cattle. What fraction of his original herd of cattle had he left?

**11.** A garden contains 5 acres. One and one half acres are planted in turnips, $2\frac{3}{4}$ acres in beets, and the remainder in beans. How many acres are planted in beans?

**12.** A man bequeaths $\frac{1}{2}$ of his property to his widow, $\frac{1}{6}$ to each of his two sons, and the remainder to his daughter. Find the daughter's share.

**13.** A boy spends $\frac{1}{4}$ of the day at school, $\frac{3}{8}$ of the day in recreation, and the remainder in sleep. What fraction of the day does he sleep?

**14.** A ranchman lost $\frac{1}{4}$ of his cattle in a blizzard, he sold $\frac{2}{3}$ of the original number, and kept the remainder. What part of his herd did he keep?

**15.** From a piece of cloth containing $2\frac{1}{3}$ yards, $1\frac{1}{2}$ yards are sold. What fraction of a yard remains?

**16.** A man sold $1\frac{1}{2}$ acres of land one day and $2\frac{1}{3}$ acres the next day. How many acres did he sell in the two days?

**17.** A man bought $4\frac{1}{2}$ tons of coal for his winter's fuel. How many tons remained after $2\frac{3}{4}$ tons were consumed?

**18.** A man earned $\$4\frac{1}{2}$ in two days. If he earned $\$2\frac{2}{5}$ the first day, how much did he earn the second day?

**19.** A horse eats $\frac{1}{4}$ of a peck of grain at one meal and $\frac{1}{8}$ of a peck at the next meal. What fraction of a peck does he eat at both meals?

**20.** An elephant eats $\frac{3}{4}$ of a bushel of grain one day and $\frac{7}{8}$ of a bushel the next day. How many bushels of grain does he eat in the two days?

**21.** A carpenter earns on three successive days $\$2\frac{1}{2}$, $\$2\frac{3}{4}$, and $\$1\frac{1}{2}$. How much does he earn in the three days?

**22.** From a roll of matting containing 40 yards, $24\frac{1}{2}$ yards were sold. How many yards remained in the roll?

**23.** If I buy a rocking-chair for $\$3\frac{3}{5}$, and give in payment a 5-dollar bill, how much change should I get?

**24.** A ton of coal costs $\$5\frac{1}{2}$ and a cord of wood costs $\$3\frac{4}{5}$. How much more does a ton of coal cost than a cord of wood?

## MULTIPLICATION

### No. 44

$\frac{2}{3}$ of $8 = ?$

SOLUTION. $\frac{1}{3}$ of $8 = \frac{8}{3}$.

Therefore, $\frac{2}{3}$ of $8 = \frac{2 \times 8}{3} = \frac{16}{3} = 5\frac{1}{3}$.

$8 \times \frac{2}{3} = ?$

SOLUTION. $8 \times 2$ thirds $= 16$ thirds $= \frac{16}{3} = 5\frac{1}{3}$.

1. $\frac{2}{3}$ of 12 = ?
2. $\frac{3}{4}$ of 16 = ?
3. $\frac{2}{3}$ of 11 = ?
4. $\frac{2}{3}$ of 36 = ?
5. $\frac{3}{4}$ of 36 = ?
6. $\frac{5}{6}$ of 18 = ?
7. $\frac{5}{6}$ of 54 = ?
8. $\frac{3}{8}$ of 16 = ?
9. $\frac{3}{8}$ of 32 = ?
10. $\frac{3}{8}$ of 13 = ?
11. $\frac{5}{8}$ of 10 = ?
12. $\frac{5}{8}$ of 12 = ?
13. $\frac{7}{8}$ of 16 = ?
14. $\frac{7}{8}$ of 24 = ?
15. $\frac{7}{8}$ of 12 = ?
16. $\frac{2}{5}$ of 60 = ?
17. $\frac{3}{5}$ of 60 = ?
18. $\frac{4}{5}$ of 60 = ?
19. $\frac{2}{5}$ of 30 = ?
20. $\frac{3}{5}$ of 30 = ?
21. $\frac{4}{5}$ of 30 = ?
22. $\frac{2}{3}$ of 30 = ?
23. $\frac{3}{4}$ of 30 = ?
24. $\frac{3}{8}$ of 30 = ?
25. $\frac{7}{10}$ of 30 = ?
26. $\frac{3}{7}$ of 14 = ?
27. $\frac{3}{7}$ of 42 = ?
28. $\frac{7}{8}$ of 56 = ?
29. $\frac{5}{6}$ of 30 = ?
30. $\frac{7}{8}$ of 48 = ?
31. $\frac{9}{10}$ of 100 = ?
32. $\frac{7}{10}$ of 100 = ?
33. $\frac{4}{5}$ of 100 = ?
34. $\frac{4}{9}$ of 27 = ?
35. $\frac{5}{9}$ of 81 = ?
36. $\frac{2}{7}$ of 365 = ?
37. $\frac{3}{7}$ of 365 = ?
38. $\frac{4}{7}$ of 365 = ?
39. $\frac{5}{7}$ of 365 = ?
40. $\frac{6}{7}$ of 365 = ?
41. $\frac{5}{6}$ of 60 = ?
42. $\frac{3}{4}$ of 60 = ?
43. $\frac{2}{3}$ of 60 = ?
44. $\frac{3}{8}$ of 60 = ?
45. $\frac{5}{8}$ of 60 = ?
46. $\frac{7}{8}$ of 60 = ?
47. $\frac{9}{10}$ of 60 = ?
48. $\frac{17}{20}$ of 60 = ?
49. $\frac{17}{20}$ of 50 = ?
50. $\frac{1}{7}$ of 365 = ?
51. $\frac{2}{3}$ of 360 = ?
52. $\frac{5}{6}$ of 180 = ?
53. $\frac{3}{4}$ of 90 = ?
54. $\frac{4}{5}$ of 90 = ?

55. If a ton of hay sells for \$10, at this rate what will $\frac{3}{4}$ of a ton sell for?

56. $\frac{3}{4}$ of a field is planted in corn. If there are 38 acres in the field, how many acres are planted in corn?

**57.** An orchard yields 360 barrels of apples. If $\frac{2}{3}$ of the apples are sold at one time, how many barrels remain?

**58.** A boy has 75¢ and spends $\frac{4}{5}$ of it for an arithmetic. How many cents has he left?

**59.** A man has $150 deposited in bank. If he draws out $\frac{2}{5}$ of his money, what is then the amount of his bank account?

**60.** A clerk earns $65 a month. If he spends $\frac{3}{5}$ of his monthly salary for board and other necessaries, how much does he spend? How much does he save?

**61.** A barrel of flour contains 196 pounds. After $\frac{3}{4}$ of the flour is used, how many pounds will remain?

**62.** The price of a cow is $\frac{2}{5}$ of the price of a horse. Find the price of the cow, if the price of the horse is $120.

**63.** When turkeys sell for $1.75 apiece, and 2 turkeys bring as much as 7 ducks, find the price of a duck.

**64.** A father gives $\frac{2}{5}$ of a farm to his son. If the farm contains 640 acres, how many acres does the father give his son?

**65.** A piece of cloth contains $4\frac{1}{2}$ yards. If $\frac{2}{3}$ of the piece is sold, how many yards are sold? How many yards remain unsold?

**66.** A grade in a certain school contains 48 pupils. If $\frac{5}{6}$ of these are promoted at the end of the year, how many pupils are promoted? How many fail to be promoted?

What is the number if:

67. $\frac{1}{6}$ of it is $7\frac{2}{3}$? $9\frac{2}{3}$? $4\frac{1}{2}$? $4\frac{3}{4}$? $5\frac{7}{8}$?

68. $\frac{1}{8}$ of it is $3\frac{1}{2}$? $4\frac{3}{4}$? $9\frac{3}{4}$? $7\frac{1}{8}$? $5\frac{2}{3}$?

69. $\frac{1}{9}$ of it is $4\frac{2}{3}$? $9\frac{2}{3}$? $4\frac{1}{4}$? $7\frac{1}{4}$? $8\frac{3}{4}$?

70. $\frac{1}{10}$ of it is $1\frac{3}{4}$? $4\frac{3}{4}$? $8\frac{1}{4}$? $5\frac{2}{3}$? $7\frac{7}{9}$?

71. $\frac{1}{12}$ of it is $1\frac{2}{3}$? $5\frac{2}{3}$? $8\frac{1}{3}$? $3\frac{5}{6}$? $4\frac{1}{6}$?

72. $\frac{1}{4}$ of it is $9\frac{1}{2}$? $4\frac{2}{3}$? $7\frac{2}{3}$? $2\frac{5}{6}$? $3\frac{1}{6}$?

73. $\frac{1}{5}$ of it is $3\frac{1}{10}$? $5\frac{3}{10}$? $8\frac{1}{5}$? $7\frac{3}{4}$? $11\frac{3}{4}$?

74. $\frac{1}{3}$ of it is $9\frac{2}{3}$? $10\frac{1}{6}$? $3\frac{5}{6}$? $5\frac{5}{6}$? $17\frac{1}{2}$?

75. $\frac{1}{2}$ of it is $1\frac{7}{8}$? $5\frac{3}{8}$? $9\frac{5}{8}$? $12\frac{7}{8}$? $13\frac{5}{8}$?

76. $\frac{1}{7}$ of it is $1\frac{3}{4}$? $2\frac{1}{4}$? $3\frac{3}{8}$? $4\frac{1}{2}$? $5\frac{3}{8}$?

77. $\frac{1}{11}$ of it is $1\frac{9}{11}$? $3\frac{7}{11}$? $4\frac{6}{11}$? $5\frac{5}{11}$? $6\frac{1}{2}$?

78. $\frac{1}{15}$ of it is $1\frac{1}{3}$? $1\frac{2}{5}$? $1\frac{4}{5}$? $2\frac{2}{3}$? $3\frac{2}{3}$?

79. $\frac{1}{16}$ of it is $\frac{7}{8}$? $1\frac{1}{2}$? $1\frac{1}{4}$? $1\frac{1}{8}$? $3\frac{1}{8}$? $1\frac{7}{8}$?

80. $\frac{1}{18}$ of it is $\frac{7}{9}$? $\frac{3}{4}$? $\frac{2}{3}$? $1\frac{1}{3}$? $1\frac{1}{6}$? $1\frac{5}{6}$?

81. $\frac{1}{20}$ of it is $\frac{7}{8}$? $1\frac{1}{2}$? $1\frac{2}{5}$? $1\frac{4}{5}$? $4\frac{1}{10}$? $4\frac{9}{10}$?

82. $\frac{1}{25}$ of it is $\frac{2}{5}$? $\frac{4}{5}$? $\frac{3}{10}$? $\frac{9}{10}$? $2\frac{1}{5}$? $3\frac{1}{5}$? $4\frac{4}{5}$?

83. $\frac{1}{24}$ of it is $\frac{2}{3}$? $\frac{11}{12}$? $\frac{1}{16}$? $\frac{3}{16}$? $\frac{5}{8}$? $\frac{7}{12}$? $1\frac{1}{2}$?

84. $\frac{1}{14}$ of it is $\frac{6}{7}$? $1\frac{1}{2}$? $1\frac{2}{7}$? $1\frac{6}{7}$? $2\frac{2}{7}$? $3\frac{1}{7}$?

85. $\frac{1}{30}$ of it is $\frac{4}{5}$? $\frac{9}{10}$? $\frac{2}{9}$? $\frac{5}{9}$? $1\frac{1}{10}$? $1\frac{1}{3}$? $2\frac{2}{3}$?

86. $\frac{1}{40}$ of it is $\frac{1}{16}$? $\frac{3}{16}$? $\frac{5}{8}$? $\frac{3}{4}$? $1\frac{1}{5}$? $2\frac{1}{8}$? $2\frac{1}{2}$?

87. $\frac{1}{50}$ of it is $\frac{2}{25}$? $\frac{6}{25}$? $1\frac{1}{5}$? $1\frac{3}{5}$? $2\frac{1}{2}$? $1\frac{1}{4}$? $1\frac{3}{4}$?

88. $\frac{1}{44}$ of it is $\frac{8}{11}$? $\frac{9}{11}$? $\frac{3}{11}$? $\frac{9}{22}$? $\frac{5}{22}$? $1\frac{1}{4}$? $1\frac{2}{11}$?

89. $\frac{1}{32}$ of it is $\frac{5}{16}$? $\frac{9}{16}$? $\frac{1}{2}$? $\frac{1}{4}$? $1\frac{1}{4}$? $2\frac{1}{2}$? $3\frac{1}{2}$?

90. $\frac{1}{20}$ of it is $\frac{3}{8}$? $\frac{5}{8}$? $5\frac{1}{2}$? $6\frac{1}{4}$? $8\frac{1}{4}$? $10\frac{1}{2}$? $12\frac{1}{2}$?

## No. 45

$\frac{2}{3}$ of $\frac{7}{8}$ = ?

SOLUTION. $\frac{1}{3}$ of $\frac{1}{8} = \frac{1}{3 \times 8}$.

Therefore, $\frac{1}{3}$ of $\frac{7}{8} = \frac{1 \times 7}{3 \times 8}$.

Therefore, $\frac{2}{3}$ of $\frac{7}{8} = \frac{2 \times 7}{3 \times 8} = \frac{14}{24} = \frac{7}{12}$.

Find the product of:

1. $\frac{1}{2}$ and $\frac{1}{4}$.
2. $\frac{1}{2}$ and $\frac{2}{3}$.
3. $\frac{2}{3}$ and $\frac{3}{4}$.
4. $\frac{1}{2}$ and $\frac{3}{4}$.
5. $\frac{1}{2}$ and $\frac{5}{6}$.
6. $\frac{2}{3}$ and $\frac{5}{6}$.
7. $\frac{4}{5}$ and $\frac{5}{8}$.
8. $\frac{3}{5}$ and $\frac{3}{8}$.
9. $\frac{2}{5}$ and $\frac{3}{4}$.
10. $\frac{4}{5}$ and $\frac{3}{4}$.
11. $\frac{2}{3}$ and $1\frac{1}{2}$.
12. $\frac{3}{5}$ and $\frac{2}{3}$.
13. $\frac{1}{2}$ and $\frac{14}{15}$.
14. $\frac{1}{2}$ and $\frac{16}{19}$.
15. $\frac{1}{2}$ and $\frac{6}{7}$.
16. $\frac{1}{3}$ and $\frac{15}{16}$.
17. $\frac{2}{3}$ and $\frac{9}{10}$.
18. $\frac{2}{3}$ and $\frac{6}{7}$.
19. $\frac{3}{4}$ and $\frac{9}{10}$.
20. $\frac{3}{4}$ and $\frac{16}{17}$.
21. $\frac{3}{4}$ and $\frac{20}{21}$.
22. $\frac{2}{3}$ and $\frac{20}{21}$.
23. $\frac{4}{5}$ and $\frac{20}{21}$.
24. $\frac{3}{4}$ and $\frac{24}{25}$.
25. $\frac{2}{3}$ and $\frac{24}{25}$.
26. $\frac{5}{6}$ and $\frac{24}{25}$.
27. $\frac{5}{6}$ and $\frac{1}{9}$.
28. $\frac{5}{6}$ and $\frac{5}{9}$.
29. $\frac{11}{12}$ and $\frac{24}{25}$.
30. $\frac{9}{10}$ and $\frac{20}{21}$.
31. $\frac{3}{11}$ and $\frac{22}{25}$.
32. $\frac{5}{11}$ and $\frac{33}{35}$.
33. $\frac{5}{9}$ and $\frac{6}{11}$.
34. $\frac{3}{8}$ and $\frac{4}{7}$.
35. $\frac{3}{5}$ and $\frac{5}{7}$.
36. $\frac{4}{5}$ and $\frac{10}{11}$.

## No. 46

1. If $\frac{2}{3}$ of a yard of cloth costs 90 ¢, find the cost of 1 yard of cloth.

SOLUTION. $\frac{2}{3}$ of a yard costs 90¢.

Therefore, $\frac{1}{3}$ of a yard costs $\frac{1}{2}$ of 90¢, that is 45¢.

Therefore, $\frac{3}{3}$ of a yard costs 3 times 45¢, which is $1.35.

Therefore, one yard costs $1.35.

2. If $\frac{3}{4}$ of a yard of cloth costs $1.05, find the cost of 1 yard.

3. If $\frac{3}{4}$ of a bushel of wheat costs 63¢, find the cost of 1 bushel of wheat.

4. A lady buys $\frac{3}{4}$ of a yard of ribbon for 60¢. Find the price per yard.

5. Five sixths of the distance between two cities is 15 miles. What is the distance between the cities?

6. Two thirds of the distance between New York and Chicago is 640 miles. What is the distance between New York and Chicago?

7. A farmer sells $\frac{2}{3}$ of the corn he raised. If he sells 240 bushels, how many bushels of corn did he raise?

8. If $\frac{5}{6}$ of my age is 35 years, how old am I?

9. A dealer sells $\frac{3}{8}$ of a barrel of sugar. If he sells 120 pounds, how many pounds were in the barrel?

10. Three eighths of a section of land is 240 acres. How many acres of land are in a section?

11. Three eighths of a mile is 120 rods. How many rods are in a mile?

**12.** Three eighths of a barrel of flour is $73\frac{1}{2}$ pounds. How many pounds make a barrel of flour?

**13.** A farmer sells 16 tons of hay, which is $\frac{2}{5}$ of the number of tons he cut. How many tons did he cut?

**14.** Three sevenths of a man's bank account is \$150. Find the man's bank account.

**15.** A man spends $\frac{3}{5}$ of his monthly salary. If he spends \$42 a month, what is his monthly salary?

**16.** Seven eighths of a plot of ground contains 21 acres. How many acres are in the plot of ground?

**17.** A train runs 24 miles in $\frac{2}{3}$ of an hour. Find its rate, in miles, per hour.

**18.** A bicyclist rides $7\frac{1}{2}$ miles in $\frac{3}{5}$ of an hour. What is his rate, in miles, per hour?

**19.** Four fifths of the rent collected by a property owner amounts to \$100 a month. What is the amount of his rent per month?

**20.** A man spends $\frac{2}{3}$ of his income. If he spends \$500 a year, what is his income?

**21.** A man buys a house and lot. He pays for the lot $\frac{2}{5}$ as much as he pays for the house. If the lot costs \$800, how much does he pay for the house?

**22.** A commission merchant sells, on Monday, $\frac{1}{2}$ of a consignment of cotton, on Tuesday he sells $\frac{1}{3}$ of the consignment. If he has 175 bales remaining, how many bales of cotton were in the consignment?

**23.** A ranchman sold $\frac{2}{9}$ of a herd of cattle. If the number sold was 90, how many cattle were in the herd?

**24.** If $\frac{5}{7}$ of my money is \$3,000, how much money have I?

**25.** $\frac{2}{11}$ of a mile is 320 yards. How many yards are in a mile?

**26.** If $\frac{9}{25}$ of the distance between Galveston and Houston is 18 miles, how far is it from Galveston to Houston?

**27.** Three tenths of the population of a city is 24,300. Find the population of the city.

**28.** A man owns $\frac{2}{5}$ of a mill. If his share is valued at \$1,250, what is the value of the mill?

## DIVISION

### No. 47

Divide $\frac{1}{2}$ by $\frac{2}{3}$.

SOLUTION. To solve this problem, first, reduce the fractions to the same denomination.

$\frac{1}{2} = 3$ sixths.

$\frac{2}{3} = 4$ sixths.

Therefore, $\frac{1}{2} \div \frac{2}{3} = 3$ sixths $\div$ 4 sixths $= \frac{3}{4}$.

Divide:

**1.** $\frac{1}{2}$ by $\frac{1}{3}$.

**2.** $\frac{1}{2}$ by $\frac{1}{5}$.

**3.** $\frac{1}{2}$ by $\frac{1}{6}$.

**4.** $\frac{1}{2}$ by $\frac{1}{7}$

**5.** $\frac{1}{2}$ by $\frac{1}{8}$.

**6.** $\frac{1}{2}$ by $\frac{1}{9}$.

7. $\frac{1}{2}$ by $\frac{1}{10}$.
8. $\frac{1}{2}$ by $\frac{1}{12}$.
9. $\frac{1}{2}$ by $\frac{1}{16}$.
10. $\frac{1}{2}$ by $\frac{1}{20}$.
11. $\frac{1}{3}$ by $\frac{1}{2}$.
12. $\frac{1}{3}$ by $\frac{1}{4}$.
13. $\frac{1}{3}$ by $\frac{3}{4}$.
14. $\frac{1}{3}$ by $\frac{1}{5}$.
15. $\frac{1}{3}$ by $\frac{1}{6}$.
16. $\frac{1}{3}$ by $\frac{1}{9}$.
17. $\frac{1}{3}$ by $\frac{1}{12}$.
18. $\frac{1}{3}$ by $\frac{1}{15}$.
19. $\frac{1}{3}$ by $\frac{4}{9}$.
20. $\frac{1}{3}$ by $\frac{5}{12}$.
21. $\frac{1}{2}$ by $1\frac{1}{2}$.
22. $\frac{1}{2}$ by $\frac{7}{8}$.
23. $\frac{1}{2}$ by $\frac{9}{16}$.
24. $\frac{1}{4}$ by $\frac{1}{3}$.
25. $\frac{1}{4}$ by $\frac{3}{4}$.
26. $\frac{1}{4}$ by $\frac{1}{5}$.
27. $\frac{1}{4}$ by $\frac{3}{5}$.
28. $\frac{1}{4}$ by $\frac{4}{5}$.
29. $\frac{1}{4}$ by $\frac{1}{8}$.
30. $\frac{1}{4}$ by $\frac{3}{8}$.
31. $\frac{1}{4}$ by $\frac{5}{8}$.
32. $\frac{1}{4}$ by $\frac{1}{12}$.
33. $\frac{1}{4}$ by $\frac{5}{12}$.
34. $\frac{1}{4}$ by $1\frac{1}{2}$.
35. $\frac{1}{4}$ by $\frac{1}{10}$.
36. $\frac{1}{5}$ by $\frac{1}{4}$.
37. $\frac{1}{5}$ by $\frac{1}{3}$.
38. $\frac{1}{5}$ by $\frac{3}{4}$.
39. $\frac{1}{5}$ by $\frac{1}{8}$.
40. $\frac{1}{5}$ by $\frac{5}{8}$.
41. $\frac{1}{5}$ by $\frac{1}{10}$.
42. $\frac{1}{5}$ by $\frac{7}{10}$.
43. $\frac{1}{5}$ by $\frac{1}{12}$.
44. $\frac{1}{5}$ by $\frac{1}{15}$.
45. $\frac{3}{5}$ by $\frac{1}{15}$.
46. $\frac{4}{5}$ by $\frac{7}{15}$.
47. $\frac{1}{6}$ by $\frac{1}{12}$.
48. $\frac{1}{6}$ by $\frac{7}{12}$.
49. $\frac{5}{6}$ by $\frac{5}{12}$.
50. $\frac{5}{6}$ by $1\frac{1}{2}$.
51. $\frac{5}{6}$ by $\frac{3}{4}$.
52. $\frac{1}{6}$ by $\frac{1}{4}$.
53. $\frac{1}{8}$ by $\frac{1}{2}$.
54. $\frac{3}{8}$ by $\frac{3}{4}$.
55. $\frac{5}{8}$ by $\frac{3}{4}$.
56. $\frac{5}{8}$ by $\frac{5}{6}$.
57. $\frac{1}{8}$ by $\frac{1}{12}$.
58. $\frac{3}{8}$ by $\frac{5}{12}$.
59. $\frac{7}{8}$ by $\frac{7}{12}$.
60. $\frac{7}{8}$ by $1\frac{1}{2}$.
61. $\frac{3}{5}$ by $\frac{3}{4}$.
62. $\frac{3}{5}$ by $\frac{3}{8}$.
63. $\frac{3}{5}$ by $\frac{5}{8}$.
64. $\frac{4}{5}$ by $\frac{5}{8}$.
65. $\frac{3}{5}$ by $\frac{3}{10}$.
66. $\frac{3}{5}$ by $\frac{7}{10}$.
67. $\frac{4}{5}$ by $\frac{9}{10}$.
68. $\frac{2}{5}$ by $\frac{3}{12}$.
69. $\frac{2}{5}$ by $\frac{4}{15}$.
70. $\frac{3}{5}$ by $\frac{7}{15}$.
71. $\frac{2}{3}$ by $\frac{3}{4}$.
72. $\frac{2}{3}$ by $\frac{3}{5}$.
73. $\frac{2}{3}$ by $\frac{5}{6}$.
74. $\frac{2}{3}$ by $\frac{5}{9}$.
75. $\frac{2}{3}$ by $\frac{8}{9}$.
76. $\frac{2}{3}$ by $\frac{5}{12}$.
77. $\frac{2}{3}$ by $\frac{7}{12}$.
78. $\frac{2}{3}$ by $1\frac{1}{2}$.
79. $\frac{2}{3}$ by $\frac{7}{15}$.
80. $\frac{2}{3}$ by $1\frac{1}{15}$.
81. $\frac{2}{3}$ by $1\frac{4}{15}$.

82. $\frac{3}{4}$ by $\frac{4}{5}$.
83. $\frac{3}{4}$ by $\frac{7}{8}$.
84. $\frac{3}{4}$ by $\frac{5}{8}$.
85. $\frac{3}{4}$ by $\frac{5}{12}$.
86. $\frac{3}{4}$ by $\frac{7}{12}$.
87. $\frac{3}{4}$ by $1\frac{1}{2}$.
88. $\frac{3}{4}$ by $\frac{9}{10}$.
89. $\frac{1}{9}$ by $\frac{1}{2}$.
90. $\frac{1}{9}$ by $\frac{3}{4}$.
91. $\frac{5}{9}$ by $\frac{3}{4}$.
92. $\frac{7}{9}$ by $\frac{1}{4}$.
93. $\frac{8}{9}$ by $\frac{3}{4}$.
94. $\frac{1}{10}$ by $\frac{1}{2}$.
95. $\frac{1}{10}$ by $\frac{1}{3}$.
96. $\frac{3}{10}$ by $\frac{1}{4}$.
97. $\frac{3}{10}$ by $\frac{2}{5}$.
98. $\frac{3}{10}$ by $\frac{3}{4}$.
99. $\frac{7}{10}$ by $\frac{4}{5}$.
100. $\frac{9}{10}$ by $\frac{4}{5}$.
101. $\frac{1}{12}$ by $\frac{1}{4}$.
102. $\frac{5}{12}$ by $\frac{2}{3}$.
103. $\frac{5}{12}$ by $\frac{3}{4}$.
104. $\frac{7}{12}$ by $\frac{5}{6}$.
105. $1\frac{1}{12}$ by $\frac{1}{6}$.

## No. 48

A yard of matting costs $\$\frac{2}{5}$. How many yards of matting can be bought for \$10?

SOLUTION.

$\$\frac{2}{5} \times$ the number of yards $= \$10$.

Therefore, the number of yards $= \$10 \div \$\frac{2}{5}$.

$10 = 50$ fifths.

Therefore, $\$10 \div \$\frac{2}{5} = 50$ fifths $\div 2$ fifths

$= 25$. *Ans.* 25 yards.

1. If a pound of butter costs $\$\frac{1}{4}$, how many pounds can be bought for $\$2\frac{3}{4}$?

2. If a chicken costs $\$\frac{9}{20}$, how many chickens can be bought for $\$1\frac{7}{20}$?

3. If a pound of coffee costs $\$\frac{3}{10}$, how many pounds can be bought for $\$1\frac{1}{2}$?

4. A pound of tea costs $\$\frac{3}{5}$. How many pounds of tea can be bought for $\$2\frac{2}{5}$?

5. Two dozen eggs are worth $\$\frac{7}{20}$. At this price, how many dozen eggs must I sell to realize $\$2\frac{1}{10}$?

6. A city lot contains $\frac{2}{9}$ of an acre. How many city lots are in a block containing $2\frac{2}{3}$ acres?

7. I can buy 5 pounds of ham for $\$\frac{4}{5}$. How many pounds of ham can I buy for $\$1\frac{3}{5}$?

8. When the price of wheat is $\$\frac{4}{5}$ per bushel, how many bushels must be sold to bring $\$4\frac{4}{5}$?

9. When the price of barley is $\$\frac{2}{5}$ per bushel, how many bushels of barley must be sold to bring $\$7\frac{3}{5}$?

10. When the price of a turkey is $\$1\frac{3}{4}$, how many turkeys can I buy for $\$12\frac{1}{4}$?

11. When the price of lace is $\$3\frac{1}{2}$ a yard, how many yards can be bought for $\$21$?

12. A haystack contains $3\frac{5}{6}$ tons of hay. How many such stacks will it take to fill a barn which holds 23 tons?

13. A cord of wood costs $\$4\frac{3}{5}$. How many cords of wood can be bought for $\$18\frac{2}{5}$?

14. If a horse consumes $\frac{2}{3}$ of a ton of hay in 1 month, how long will it take him to consume 5 tons of hay?

15. How long will it take a man to walk $20\frac{1}{4}$ miles at the rate of $2\frac{1}{4}$ miles per hour?

16. When pears sell for $\$\frac{5}{6}$ a bushel, how many bushels must be sold to bring $\$7\frac{1}{2}$?

**17.** The area of a lot in a certain block is $\frac{2}{7}$ of an acre. How many such lots are in a block containing 4 acres?

**18.** If a train runs at the rate of $25\frac{1}{2}$ miles an hour, how long will it take it to run $6\frac{3}{8}$ miles?

**19.** At $12\frac{1}{2}¢$ a pound, how many pounds of meat can be bought for $\$1$?

**20.** At $4\frac{1}{4}¢$ a pound, how many pounds of sugar can be bought for $85¢$?

**21.** How many gallons of molasses at $\$\frac{3}{4}$ a gallon can be bought for $\$8\frac{1}{4}$?

**22.** If it takes $\frac{5}{12}$ of a yard of ribbon to make a badge, how many badges can be made from 25 yards of ribbon?

**23.** If roses are bought at the rate of $\$1\frac{1}{2}$ a dozen, how many dozen can be bought for $\$4\frac{1}{2}$?

**24.** If oranges sell at the rate of $1\frac{2}{3}¢$ apiece and a box of oranges brings $\$3\frac{1}{2}$, how many oranges are in the box?

**25.** If a box of strawberries sells for $\$\frac{3}{20}$ and a crate of strawberries brings $\$1\frac{4}{5}$, how many boxes are in the crate?

**26.** How many fruit jars each containing $\frac{3}{8}$ of a gallon are required to hold 6 gallons of preserves?

**27.** A team plows $2\frac{1}{5}$ acres per day. In how many days will a team plow a field containing 22 acres?

**28.** If a bicyclist rides $8\frac{1}{3}$ miles an hour, how many hours will it take him to ride 15 miles?

**29.** If a man does $\frac{2}{11}$ of a piece of work in one day, how long will it take him to finish the work?

**30.** If $\frac{2}{5}$ of a cistern can be filled by a pipe in one hour, how many hours will it take the pipe to fill the cistern?

**31.** When it takes a man $3\frac{1}{2}$ hours to walk 10 miles, what is his rate of walking per hour?

**32.** If a steamboat makes a trip of 22 miles in $1\frac{3}{4}$ hours, what is its rate per hour?

**33.** If 1 man builds a wall in $10\frac{1}{2}$ days, how long will it take 6 men to build the same wall?

**34.** If 1 man can build a wall in $22\frac{1}{2}$ days, how long will it take 9 men to build the same wall?

**35.** When 1 team can plow a field in $12\frac{1}{2}$ days, how long will it take 5 teams to plow the same field?

**36.** A tub of butter containing $27\frac{1}{2}$ pounds is put up in $2\frac{1}{2}$ pound packages. Find the number of packages.

## DECIMALS

### No. 49

Read:

| | | |
|---|---|---|
| **1.** .3. | **4.** .99. | **7.** 5.7. |
| **2.** .25. | **5.** 1.1. | **8.** 6.9. |
| **3.** .74. | **6.** 3.4. | **9.** 1.75. |

10. 3.95.
11. 4.05.
12. 4.01.
13. 5.10.
14. 8.123.
15. .785.
16. .649.
17. .650.
18. .778.
19. 1.101.
20. 1.055.
21. 5.001.
22. 8.019.
23. .10.
24. .01.
25. .001.
26. .100.
27. .010.
28. 7.773.
29. 9.048.
30. .0001.
31. .1001.
32. .2104.
33. .0056.
34. .3201.
35. .7609.
36. 1.5432.
37. 7.0592.
38. 8.9949.
39. 10.0101.
40. 11.0011.
41. 17.5006.
42. 15.0015.
43. 27.7349.
44. 28.0009.
45. 30.3030.
46. 50.5051.
47. .78943.
48. .00273.
49. .05992.
50. .03834.
51. 10.01011.
52. .12354.
53. .37689.
54. 24.54724.
55. 25.62001.
56. 15.00159.
57. 27.00029.
58. 32.00018.
59. 1.00013.
60. 5.00008.
61. 7.00001.
62. 9.00998.
63. 5.010505.
64. 4.080905.
65. .123456.
66. .032714.
67. .444455.
68. .506071.
69. .928482.

## No. 50

What is the sum of:

1. 15 hundredths and 25 hundredths?
2. 75 hundredths and 25 hundredths?
3. 1 tenth and 5 hundredths?

4. 5 tenths and 7 hundredths?
5. 89 hundredths and 1 tenth?
6. 68 hundredths and 4 tenths?
7. 23 thousandths and 8 hundredths?
8. 75 thousandths and 75 hundredths?
9. 65 thousandths and 45 thousandths?
10. 55 thousandths and 45 hundredths?
11. 125 thousandths and 75 thousandths?
12. 625 thousandths and 3 tenths?
13. 725 thousandths and 3 tenths?
14. 83 thousandths and 17 thousandths?

## No. 51

1. What must I add to 25 hundredths to get 1 for the sum?

2. What must I add to 15 hundredths to get 1 for the sum?

3. What must I add to 23 hundredths to get 1 for the sum?

4. By how much does 1 exceed 61 hundredths?

5. By how much does 1 exceed 1 tenth? 2 tenths? 5 tenths? 1 hundredth? 5 hundredths? 35 hundredths? 54 hundredths? 72 hundredths? 87 hundredths?

6. By how much does 1 exceed 1 thousandth? 5 thousandths?

**7.** By how much does 1 exceed 8 thousandths? 12 thousandths?

**8.** By how much does 1 exceed 18 thousandths? 83 thousandths?

**9.** By how much does 1 exceed 125 thousandths? 211 thousandths?

**10.** By how much does 1 exceed 324 thousandths?

**11.** What number must be taken from 1 to give as remainder 111 thousandths?

**12.** What number must be taken from 1 to give as remainder 99 thousandths?

**13.** What number must be taken from 1 to give as remainder 803 thousandths?

**14.** What number must be taken from 1 to give as remainder 5 ten-thousandths?

**15.** What number must be taken from 1 to give as remainder 33 ten-thousandths?

**16.** What number must be taken from 1 to give as remainder 127 ten-thousandths?

**17.** Find the difference between 1 tenth and 1 hundredth; 5 tenths and 4 hundredths; 6 tenths and 9 hundredths; 7 tenths and 8 hundredths.

**18.** Find the difference between 1 tenth and 1 hundredth; 5 tenths and 3 hundredths; 6 tenths and 7 hundredths; 8 tenths and 9 hundredths; 2 tenths and 1 thousandth.

**19.** Find the difference between 3 tenths and 3 thousandths; 7 tenths and 6 thousandths; 4 tenths and 5 thousandths; 2 tenths and 9 thousandths; 8 tenths and 11 thousandths.

**20.** Find the difference between 5 and 5 tenths; 5 and 5 hundredths; 5 and 5 thousandths; 5 and 5 ten-thousandths; 10 and 10 hundredths.

**21.** Find the difference between 10 and 10 thousandths; 10 and 115 thousandths; 10 and 12 tenths; 10 and 15 tenths; 10 and 25 tenths.

**22.** Find the difference between 100 and 1 hundredth; 600 and 6 hundredths; 1,000 and 1 thousandth; 5,000 and 5 thousandths.

## No. 52

**23.** How many tenths make 10? How many tenths make 50? How many tenths make 12?

**24.** How many hundredths make 1? How many hundredths make 10? How many hundredths make 100? How many hundredths make 12?

**25.** How many hundredths make 1 and 2 tenths? How many hundredths make 2.5? 3.7? 5.5? 6.72? 8.64? 9.99?

**26.** How many thousandths make 1? 2? 10? 15? 85? 100? 500?

**27.** How many thousandths make 1,000? 1.1? 4.5? 6.6? 9.9?

**28.** How many thousandths make 3.75? 8.85? 7.92? 8.54?

**29.** Square .1; .2; .3; .4; .5; .6; .7; .8; .9; 10 tenths.

**30.** Cube .1; .2; .3; .4; .5; .6; .7; .8; .9; 10 tenths.

**31.** How do you multiply a number by 10? by 100? by 1,000? by 10,000? by 100,000?

**32.** How do you multiply a number by 1,000,000?

**33.** Give in succession the names of the first six places to the right of the decimal point.

**34.** Give in succession the names of the first six places to the left of the decimal point.

**35.** How is a number expressed in the decimal system of notation read? How is a decimal number written?

Multiply by 10:

**36.** 1.2; 5.5; 6.7; 1.23; 3.45; 7.78; 9.234; 8.276.

Multiply by 100:

**37.** 3.2; 6.4; 7.1; 8.3; 5.9; 4.4; 8.8; 7.7; 9.8; 1.1.

Multiply by 100:

**38.** 2.25; 3.76; 4.95; 6.67; 9.52; 5.2357; 8.1247; .001; .0009.

Multiply by 100:

**39.** .07985; .7845; 5236; 43301; 1.73201; 4.8284; 3.6339.

Multiply by 1,000 :

40. 2.1; 4.5; 5.6; 7.9; 9.1; 9.9; 8.2; 9.4; 4.9; 3.8; 2.9.

Multiply by 1,000 :

41. 1.73; 2.68; 5.01; 8.25; 2.58; 3.36; 11.19; 12.37.

Multiply by 1,000 :

42. 15.432; 16.714; 19.995; 18.407; .001; .0009; .0178; .0928.

Multiply by 10,000 :

43. 4.478; 2.92; 3.01; 3.426; 17; 19.1; 20.4; 1.1; 5.2.

## No. 53

Divide by 10 :

1. 1.5; 5.3; 4.9; 49.11; 56.18; .23; .78; .54; .0123.

Divide by 100 :

2. 54; 98; 125; 792; 934; 5,718; 10,000; 1,000,000; 14,218.

Divide by 100 :

3. 1.2; 1.5; 9.98; 7.97; .235; .984; 921; .019; .004.

Divide by 1,000 :

4. 5,417; 6,219; 18,784; 19,980; 1,000,000 1,100,000; 15,218.

Divide by 1,000:

5. 235; 456.9; 792.5; 23.4; 25.2; 25.17; 9.19; 5.14; 7.84.

Divide by 1,000:

6. .5; .9; .83; .98; .79; .784; .9348; .235; .0721; .01.

Divide 5 by:

7. .1; .01; .001; .0001; .2; .4; .5; .05; .005; .08; .008.

Divide 7.2 by:

8. .2; .3; .4; .5; .9; .08; .09; .24; .012; .024.

## No. 54

Express .75 as a common fraction in its simplest form.

SOLUTION. $.75 = \frac{75}{100} = \frac{3}{4}$.

Express as common fractions in simplest forms:

| | | | | |
|---|---|---|---|---|
| 1. .25. | 8. .8. | 15. .96. | 22. .14. | 29. .625. |
| 2. .15. | 9. .16. | 16. .65. | 23. .22. | 30. .875. |
| 3. .35. | 10. .28. | 17. .05. | 24. .44. | 31. .128. |
| 4. .55. | 11. .36. | 18. .68. | 25. .66. | 32. .152. |
| 5. .85. | 12. .72. | 19. .76. | 26. .59. | 33. .176. |
| 6. .95. | 13. .88. | 20. .38. | 27. .125. | 34. .264. |
| 7. .08. | 14. .92. | 21. .18. | 28. .375. | 35. .888. |

## No. 55

Express as a decimal each of the following:

| | | | | |
|---|---|---|---|---|
| 1. $\frac{1}{2}$. | 7. $\frac{1}{8}$. | 13. $\frac{3}{4}$. | 19. $\frac{5}{7}$. | 25. $\frac{5}{11}$. |
| 2. $\frac{1}{3}$. | 8. $\frac{1}{9}$. | 14. $\frac{3}{5}$. | 20. $\frac{6}{7}$. | 26. $\frac{7}{11}$. |
| 3. $\frac{1}{4}$. | 9. $\frac{1}{10}$. | 15. $\frac{4}{5}$. | 21. $\frac{3}{8}$. | 27. $\frac{9}{11}$. |
| 4. $\frac{1}{5}$. | 10. $\frac{1}{11}$. | 16. $\frac{5}{6}$. | 22. $\frac{5}{8}$. | 28. $\frac{10}{11}$. |
| 5. $\frac{1}{6}$. | 11. $\frac{1}{12}$. | 17. $\frac{2}{7}$. | 23. $\frac{7}{8}$. | 29. $\frac{5}{12}$. |
| 6. $\frac{1}{7}$. | 12. $\frac{2}{3}$. | 18. $\frac{3}{7}$. | 24. $\frac{2}{11}$. | 30. $\frac{7}{12}$. |

## No. 56

Memorize:

$25 = \frac{1}{4}$ of 100.
$75 = \frac{1}{4}$ of 300, or $\frac{3}{4}$ of 100.
$125 = \frac{1}{8}$ of 1,000.
$250 = \frac{1}{4}$ of 1,000.
$375 = \frac{1}{8}$ of 3,000, or $\frac{3}{8}$ of 1,000.
$625 = \frac{1}{8}$ of 5,000, or $\frac{5}{8}$ of 1,000.
$875 = \frac{1}{8}$ of 7,000, or $\frac{7}{8}$ of 1,000.

## No. 57

Multiply 77 by 875.

SOLUTION.

$77 \times 875 = 77 \times \frac{1}{8}$ of $7{,}000 = \frac{539000}{8} = 67{,}375$.

Multiply:

| | | |
|---|---|---|
| 1. 17 by 25. | 3. 39 by 25. | 5. 67 by 25. |
| 2. 27 by 25. | 4. 58 by 25. | 6. 75 by 25. |

7. 85 by 25.
8. 94 by 25.
9. 99 by 25.
10. 87 by 25.
11. 49 by 25.
12. 73 by 25.
13. 13 by 75.
14. 18 by 75.
15. 23 by 75.
16. 31 by 75.
17. 36 by 75.
18. 64 by 75.
19. 75 by 75.
20. 19 by 125.
21. 51 by 125.
22. 71 by 125.
23. 87 by 125.
24. 94 by 125.
25. 218 by 250.
26. 65 by 250.
27. 17 by 375.
28. 25 by 375.
29. 27 by 375.
30. 36 by 375.
31. 13 by 875.
32. 24 by 875.
33. 32 by 875.
34. 19 by 875.
35. 22 by 875.
36. 29 by 875.

## No. 58

Express as a common fraction in its simplest form:

1. $.85\frac{5}{7}$.

SOLUTION. $.85\frac{5}{7} = \frac{85\frac{5}{7}}{100} = \frac{600}{700} = \frac{6}{7}$.

2. $.3\frac{1}{3}$.
3. $.6\frac{2}{3}$.
4. $.1\frac{1}{9}$.
5. $.4\frac{4}{9}$.
6. $.5\frac{5}{9}$.
7. $.7\frac{7}{9}$.
8. $.12\frac{1}{2}$.
9. $.37\frac{1}{2}$.
10. $.62\frac{1}{2}$.
11. $.87\frac{1}{2}$.
12. $.14\frac{2}{7}$.
13. $.28\frac{4}{7}$.
14. $.42\frac{6}{7}$.
15. $.71\frac{3}{7}$.
16. $.88\frac{8}{9}$.
17. $.00\frac{1}{2}$.
18. $.00\frac{3}{4}$.
19. $.00\frac{1}{3}$.
20. $.00\frac{7}{8}$.
21. $.00\frac{5}{8}$.

## No. 59

1. What will 12 pounds of meat cost at $8\frac{1}{2}¢$ a pound?
2. What will 16 pounds of butter cost at $25¢$ a pound?

3. What will 8 yards of cloth cost at $87\frac{1}{2}¢$ a yard?

4. Find the cost of 1 dozen knives at $37\frac{1}{2}¢$ apiece.

5. Find the cost of 1 dozen knives at $62\frac{1}{2}¢$ apiece.

6. Find the cost of 2,500 feet of lumber at $17 per 1,000 feet.

7. Find the cost of 300 pounds of wheat at $.014 a pound.

8. What must I pay for 200 pounds of flour at $1\frac{3}{4}¢$ a pound?

9. Find the value of a bale of cotton weighing 500 pounds at $8\frac{1}{8}¢$ per pound; at $8\frac{1}{4}¢$; at $8\frac{3}{8}¢$; at $7\frac{7}{8}¢$; at $7\frac{3}{4}¢$.

10. Find the value of a round bale of cotton weighing 200 pounds at $8\frac{1}{4}¢$ a pound; at $8\frac{1}{8}¢$; at $7\frac{7}{8}¢$; at $7\frac{3}{4}¢$.

11. Find the value of a bale of cotton weighing 495 pounds at $8¢$ a pound.

12. Find the value of 100 yards of ribbon at $35\frac{1}{2}¢$ a yard.

13. A trader sold 100 head of fat cattle, averaging 1,200 pounds, at $5¢$ a pound; what did he get for his cattle?

14. Find the value of 100 bushels of wheat when the market quotation is $79\frac{5}{7}$.

15. Find the value of 1,000 bushels of wheat quoted at $81\frac{1}{8}$.

16. Find the value of 1,000 bushels of barley quoted at $46\frac{5}{8}$.

17. Find the value of 1,000 bushels of oats quoted at $29\frac{3}{8}$.

18. When a ton of coal costs \$6.50, what should be the price of 100 pounds of coal?

19. When a ton of hay sells for \$10.50, find the price of 100 pounds. Find the price of 200 pounds. Find the price of 500 pounds. Find the price of 800 pounds.

20. A dozen knives cost \$4. Find, in cents, the price of a knife.

21. When a dozen turkeys sell for \$20, what is the average price per turkey?

22. When a dozen chickens sell for \$3.50, find, in cents, the price of a chicken.

23. 30 acres of land are sold for \$1,000. Find the price of 1 acre.

24. 6 pianos were sold for \$1,700. Find the average price of a piano.

25. If I buy 15 pairs of shoes for \$34, find the cost of a pair of shoes.

26. 100 spools of thread cost \$3.85. At this price, what will 10 spools cost?

27. Oranges sell for 30¢ a dozen. At this rate, what will 4 oranges cost?

28. Lemons sell for 25¢ a dozen. At this rate, what will 9 lemons cost?

29. When 2 watermelons sell for 25¢, what is the price per dozen?

# COMPOUND QUANTITIES

## No. 60

### LINEAR MEASURE

| | |
|---|---|
| 12 inches (in.) | = 1 foot (ft.) |
| 3 feet | = 1 yard (yd.) |
| $5\frac{1}{2}$ yards | = 1 rod (rd.) |
| 320 rods | = 1 mile (mi.) |
| 6,080 feet | = 1 knot, nautical, or geographical mile |

### SURVEYOR'S LINEAR MEASURE

100 links = 1 chain (ch.)
4 rods = 1 chain

**1.** How many feet are in 1 yd.? In 5 yd.? In 12 yd.? In 17 yd.?

**2.** How many feet are in 1 rod? In 2 rd.? In 3 rd.? In 5 rd.? In 8 rd.? In 10 rd.? In 20 rd.? In 40 rd.? In 60 rd.? In 80 rd.?

**3.** Reduce 24 ft. to yards; 36 ft. to yards; 48 ft. to yards; 66 ft. to yards; 100 ft. to yards; 200 ft. to yards; 600 ft. to yards; 900 ft. to yards.

Reduce to yards and feet:

**4.** 11 ft.; 17 ft.; 23 ft.; 34 ft.; 41 ft.; 52 ft.; 64 ft.; 73 ft.; 82 ft.; 89 ft.; 94 ft.; 100 ft.; 110 ft.

Reduce to feet:

**5.** 3 yd. 1 ft.; 6 yd. 2 ft.; 8 yd. 1 ft.; 12 yd. 1 ft.; 16 yd.

**6.** 23 yd. 1 ft.; 26 yd. 2 ft.; 24 yd. 1 ft.; 28 yd. 1 ft.

**7.** 29 yd. 2 ft.; 32 yd. 1 ft.; 37 yd. 1 ft.; 39 yd. 1 ft.

**8.** How many inches are in 1 ft.? 3 ft.? 6 ft.? 8 ft.? 10 ft.?

**9.** How many inches are in 12 ft.? 15 ft.? 16 ft.? 25 ft.? 35 ft.?

**10.** How many inches are in 1 ft. 8 in.? 2 ft. 6 in.? 3 ft. 5 in.?

How many inches are in:

**11.** 4 ft. 6 in.?
**12.** 5 ft. 3 in.?
**13.** 6 ft. 7 in.?
**14.** 7 ft. 3 in.?
**15.** 8 ft. 4 in.?
**16.** 9 ft. 2 in.?
**17.** 9 ft. 11 in.?
**18.** 10 ft. 6 in.?
**19.** 11 ft. 3 in.?
**20.** 11 ft. 8 in.?
**21.** 12 ft. 6 in.?
**22.** 13 ft. 4 in.?
**23.** 14 ft. 2 in.?
**24.** 15 ft. 3 in.?
**25.** 15 ft. 10 in.?
**26.** 16 ft. 8 in.?
**27.** 5 ft. 11 in.?
**28.** 7 ft. 7 in.?
**29.** 8 ft. 11 in.?
**30.** 9 ft. 4 in.?
**31.** 20 ft. 6 in.?
**32.** 22 ft. 6 in.?
**33.** 23 ft. 4 in.?
**34.** 29 ft. 2 in.?

How many inches are in:

| | | | |
|---|---|---|---|
| 1. $1\frac{1}{2}$ ft.? | 9. $3\frac{5}{6}$ ft.? | 17. $8\frac{3}{4}$ ft.? | 25. $25\frac{1}{6}$ ft.? |
| 2. $1\frac{1}{3}$ ft.? | 10. $5\frac{5}{6}$ ft.? | 18. $11\frac{3}{4}$ ft.? | 26. $30\frac{5}{6}$ ft.? |
| 3. $1\frac{1}{4}$ ft.? | 11. $8\frac{5}{6}$ ft.? | 19. $9\frac{1}{4}$ ft.? | 27. $33\frac{1}{3}$ ft.? |
| 4. $2\frac{1}{6}$ ft.? | 12. $5\frac{2}{3}$ ft.? | 20. $14\frac{1}{4}$ ft.? | 28. $40\frac{3}{4}$ ft.? |
| 5. $2\frac{3}{4}$ ft.? | 13. $9\frac{2}{3}$ ft.? | 21. $13\frac{5}{6}$ ft.? | 29. $61\frac{1}{6}$ ft.? |
| 6. $4\frac{1}{2}$ ft.? | 14. $12\frac{1}{3}$ ft.? | 22. $19\frac{5}{6}$ ft.? | 30. $83\frac{1}{3}$ ft.? |
| 7. $6\frac{1}{4}$ ft.? | 15. $16\frac{2}{3}$ ft.? | 23. $17\frac{2}{3}$ ft.? | 31. $56\frac{2}{3}$ ft.? |
| 8. $6\frac{5}{6}$ ft.? | 16. $18\frac{2}{3}$ ft.? | 24. $24\frac{3}{4}$ ft.? | 32. $41\frac{2}{3}$ ft.? |

What fraction of 1 ft. is:

| | | | |
|---|---|---|---|
| 1. 1 in.? | 7. 8 in.? | 13. $10\frac{1}{2}$ in.? | 19. $5\frac{1}{3}$ in.? |
| 2. 2 in.? | 8. 9 in.? | 14. $2\frac{2}{5}$ in.? | 20. $9\frac{1}{3}$ in.? |
| 3. 3 in.? | 9. 10 in.? | 15. $4\frac{4}{5}$ in.? | 21. $1\frac{1}{5}$ in.? |
| 4. 4 in.? | 10. $1\frac{1}{2}$ in.? | 16. $7\frac{1}{5}$ in.? | 22. $8\frac{2}{5}$ in.? |
| 5. 5 in.? | 11. $4\frac{1}{2}$ in.? | 17. $9\frac{3}{5}$ in.? | 23. $\frac{1}{2}$ in.? |
| 6. 7 in.? | 12. $7\frac{1}{2}$ in.? | 18. $1\frac{1}{3}$ in.? | 24. $\frac{1}{3}$ in.? |

1. How many feet are in 1 rd.? How many feet are in 10 rd.? How many feet are in 12 rd.? How many feet are in 50 rd.?

2. How many feet are in 90 rd.? How many feet are in 120 rd.? How many feet are in 320 rd.? How many feet are in 1 mi.?

How many feet are in:

| | | | |
|---|---|---|---|
| 1. $\frac{1}{2}$ mi.? | 6. $\frac{1}{5}$ mi.? | 11. $\frac{5}{8}$ mi.? | 16. .3 mi.? |
| 2. $\frac{1}{3}$ mi.? | 7. $\frac{1}{6}$ mi.? | 12. $\frac{7}{8}$ mi.? | 17. $\frac{1}{12}$ mi.? |
| 3. $\frac{2}{3}$ mi.? | 8. $\frac{5}{6}$ mi.? | 13. $\frac{1}{10}$ mi.? | 18. $\frac{5}{12}$ mi.? |
| 4. $\frac{1}{4}$ mi.? | 9. $\frac{1}{8}$ mi.? | 14. $\frac{2}{10}$ mi.? | 19. $\frac{7}{12}$ mi.? |
| 5. $\frac{3}{4}$ mi.? | 10. $\frac{3}{8}$ mi.? | 15. .8 mi.? | 20. $\frac{1}{16}$ mi.? |

What fraction of 1 mi. is:

| | | |
|---|---|---|
| 1. 1,760 ft.? | 8. 2,840 ft.? | 15. 2,310 ft.? |
| 2. 480 ft.? | 9. 1,320 ft.? | 16. 264 ft.? |
| 3. 960 ft.? | 10. 2,640 ft.? | 17. 176 ft.? |
| 4. 1,440 ft.? | 11. 4,800 ft.? | 18. 44 yd.? |
| 5. 1,920 ft.? | 12. 660 ft.? | 19. 22 yd.? |
| 6. 2,400 ft.? | 13. 990 ft.? | 20. 880 yd.? |
| 7. 3,360 ft.? | 14. 1,650 ft.? | 21. 352 yd.? |

1. How often is 3 in. contained in 2 ft. 3 in.?

2. How often is 4 in. contained in 1 yd.?

3. How often is 8 in. contained in 1 yd.?

4. If 9 in. were the unit of measurement, what number would express a yard?

5. If 6 in. were the unit of measurement, what number would express a yard?

6. If $\frac{1}{2}$ yd. were the unit of measurement, what number would express a rod?

7. If 6 in. were the unit of measurement, what number would express a rod?

8. How often is 1 yd. contained in 1 rd.?
9. How often is 2 yd. contained in 1 rd.?
10. How often is 3 yd. contained in 1 rd.?
11. What part of 1 mi. is 1 rd.?
12. What part of 1 mi. is 4 rd.?

What part of 1 mi. is:

13. 64 rd.?
14. 80 rd.?
15. $106\frac{2}{3}$ rd.?
16. $53\frac{1}{3}$ rd.?
17. 40 rd.?
18. 32 rd.?
19. $26\frac{2}{3}$ rd.?
20. $21\frac{1}{3}$ rd.?
21. 16 rd.?
22. $5\frac{1}{3}$ rd.?

1. How many yards are in 1 ch.?
2. How many feet are in 1 ch.?
3. How many inches are in 1 ch.?
4. How many inches are in 1 link?
5. How many chains make 1 mi.?
6. What fraction of a mile is 1 ch.?
7. What fraction of a mile is 4 ch.?
8. What fraction of a mile is 5 ch.?
9. What fraction of a mile is 8 ch.?
10. What fraction of a mile is 20 ch.?
11. What fraction of 1 ch. is 10 ft.?
12. What fraction of 1 ch. is 16 ft.?
13. What fraction of 1 ch. is 22 ft.?

14. How many links are in 3 ch.?
15. How many links are in 11 ch.?
16. How many links are in 17.34 ch.?
17. How many links are in 92.05 ch.?
18. How many links are in 87.75 ch.?
19. How many links are in 115.18 ch.?
20. How many links are in 1 mi.?

## No. 61

### SQUARE MEASURE

| | |
|---|---|
| 144 square inches (sq. in.) | = 1 square foot (sq. ft.) |
| 9 square feet | = 1 square yard (sq. yd.) |
| $30\frac{1}{4}$ square yards | = 1 square rod (sq. rd.) |
| 160 square rods | = 1 acre (A.) |
| 640 acres | = 1 square mile (sq. mi.) |
| 1 square mile | = 1 section |
| 36 sections | = 1 township |

How many square inches are in:

1. $\frac{1}{2}$ sq. ft.?
2. $\frac{1}{3}$ sq. ft.?
3. $\frac{2}{3}$ sq. ft.?
4. $\frac{1}{4}$ sq. ft.?
5. $\frac{3}{4}$ sq. ft.?
6. $\frac{1}{6}$ sq. ft.?
7. $\frac{5}{6}$ sq. ft.?
8. $\frac{1}{8}$ sq. ft.?
9. $\frac{3}{8}$ sq. ft.?
10. $\frac{5}{8}$ sq. ft.?
11. $\frac{7}{8}$ sq. ft.?
12. $\frac{1}{9}$ sq. ft.?
13. $\frac{2}{9}$ sq. ft.?
14. $\frac{5}{9}$ sq. ft.?
15. $\frac{7}{9}$ sq. ft.?
16. $\frac{1}{12}$ sq. ft.?
17. $\frac{5}{12}$ sq. ft.?
18. $\frac{7}{12}$ sq. ft.?
19. $\frac{11}{12}$ sq. ft.?
20. $\frac{20}{16}$ sq. ft.?
21. $\frac{1}{18}$ sq. ft.?

Reduce:

1. 2 A. to square rods.
2. 5 A. to square rods.
3. 9 A. to square rods.
4. 12 A. to square rods.
5. 15 A. to square rods.
6. $1\frac{1}{2}$ A. to square rods.
7. $2\frac{1}{2}$ A. to square rods.
8. $3\frac{1}{2}$ A. to square rods.
9. $5\frac{1}{2}$ A. to square rods.
10. $1\frac{1}{4}$ A. to square rods.
11. $3\frac{1}{4}$ A. to square rods.
12. $4\frac{1}{4}$ A. to square rods.
13. $\frac{3}{4}$ A. to square rods.
14. $\frac{5}{8}$ A. to square rods.
15. .7 A. to square rods.
16. .9 A. to square rods.
17. .16$\frac{2}{3}$ A. to square rods.
18. .83$\frac{1}{3}$ A. to square rods.
19. $\frac{11}{16}$ A. to square rods.
20. $\frac{7}{20}$ A. to square rods.
21. $2\frac{2}{3}$ sq. yd. to square feet.
22. $4\frac{1}{3}$ sq. yd. to square feet.
23. $8\frac{8}{9}$ sq. yd. to square feet.
24. $4\frac{3}{4}$ sq. yd. to square feet.
25. $11\frac{3}{4}$ sq. yd. to square feet.
26. 5 sq. rd. to square yards.
27. 10 sq. rd. to square yards.
28. 12 sq. rd. to square yards.
29. 16 sq. rd. to square yards.
30. 160 sq. rd. to square yards.

1. How many square yards are in 1 A.?
2. How many square yards are in $\frac{3}{4}$ A.?
3. How many square yards are in .3 A.?

4. How many square yards are in .9 A.?
5. How many square yards are in $\frac{2}{11}$ A.?
6. How many square yards are in $\frac{1}{20}$ A.?
7. What fraction of 1 A. is 1,210 sq. yd.?
8. What fraction of 1 A. is 968 sq. yd.?
9. What fraction of 1 A. is 484 sq. yd.?
10. What fraction of 1 A. is 1,320 sq. yd.?
11. What fraction of 1 A. is 2,200 sq. yd.?
12. What fraction of 1 A. is 3,300 sq. yd.?
13. What fraction of 1 A. is 32 sq. rd.?
14. What fraction of 1 A. is $53\frac{1}{3}$ sq. rd.?

## No. 62

### AREAS OF RECTANGLES

1. A field is 80 yd. long and 80 yd. wide. How many acres are in the field?

SOLUTION.

$$1 \text{ sq. yd.} \times 80 \times 80 = 6{,}400 \text{ sq. yd.}$$

$$4{,}840 \text{ sq. yd.} = 1 \text{ A.}$$

Therefore, $6{,}400 \text{ sq. yd.} = \frac{6{,}400}{4{,}840} \text{ A.} = 1\frac{1560}{4840} \text{ A.}$

$$= 1\frac{39}{121} \text{ A.}$$

To get the remainder in the above quotient, use the Computers' method:

$4{,}840 + 60 = 4{,}900.$ $4{,}900 + 1{,}500 = 6{,}400.$

Remainder, 1,560.

**2.** How many acres are in a field whose dimensions are 80 rd. by 30 rd.?

**3.** How many acres are in a rectangular field whose dimensions are 80 rd. by 40 rd.?

**4.** Find the area of a field 50 rd. long and 40 rd. wide.

**5.** Find the area of a field 40 rd. long and 40 rd. wide.

**6.** Find the area of a field 121 yd. long and 40 yd. wide.

**7.** How many acres are in a lot 70 yd. long and 70 yd. wide?

**8.** How many acres are in a tract of country 10 mi. long and 5 mi. wide?

**9.** How many acres are in a ranch 3 mi. long and 2 mi. wide?

**10.** How many acres are in a farm $1\frac{1}{2}$ mi. long and 1 mi. wide?

**11.** How many acres are in a farm $\frac{1}{2}$ mi. long and $\frac{1}{4}$ mi. wide?

**12.** How many acres are in the N.W. $\frac{1}{4}$ of the N.W. $\frac{1}{4}$ of a section of land?

**13.** How many acres are in the E. $\frac{1}{2}$ of a section of land?

**14.** A tract of land is $\frac{3}{8}$ of a mile long and $\frac{3}{8}$ of a mile wide. How many acres are in the tract?

**15.** A garden is 22 yd. long and 22 yd. wide. What fraction of an acre does it contain?

## No. 63

### CUBIC MEASURE

1,728 cubic inches (cu. in.) = 1 cubic foot (cu. ft.)
27 cubic feet = 1 cubic yard (cu. yd.)

How many cubic inches are in:

1. $\frac{1}{2}$ cu. ft.?
2. $\frac{1}{3}$ cu. ft.?
3. $\frac{2}{3}$ cu. ft.?
4. $\frac{1}{4}$ cu. ft.?
5. $\frac{3}{4}$ cu. ft.?
6. $\frac{1}{6}$ cu. ft.?
7. $\frac{5}{6}$ cu. ft.?
8. $\frac{1}{8}$ cu. ft.?
9. $\frac{3}{8}$ cu. ft.?
10. $\frac{5}{8}$ cu. ft.?
11. $\frac{7}{8}$ cu. ft.?
12. $\frac{1}{9}$ cu. ft.?
13. $\frac{5}{9}$ cu. ft.?
14. $\frac{8}{9}$ cu. ft.?
15. $\frac{1}{10}$ cu. ft.?
16. $\frac{1}{12}$ cu. ft.?
17. $\frac{5}{12}$ cu. ft.?
18. $\frac{7}{12}$ cu. ft.?
19. $\frac{11}{12}$ cu. ft.?
20. $\frac{1}{16}$ cu. ft.?
21. $\frac{1}{5}$ cu. ft.?
22. 2 cu. ft.?
23. 3 cu. ft.?
24. 4 cu. ft.?

1. What fraction of a cubic yard is 3 cu. ft.?
2. What fraction of a cubic yard is 6 cu. ft.?
3. What fraction of a cubic yard is 9 cu. ft.?
4. What fraction of a cubic yard is 12 cu. ft.?
5. What fraction of a cubic yard is 18 cu. ft.?
6. What fraction of a cubic yard is 24 cu. ft.?
7. What fraction of a cubic yard is $13\frac{1}{2}$ cu. ft.?
8. What fraction of a cubic yard is $6\frac{3}{4}$ cu. ft.?
9. What fraction of a cubic yard is $20\frac{1}{4}$ cu. ft.?
10. What fraction of a cubic yard is $5\frac{2}{5}$ cu. ft.?

11. What fraction of a cubic yard is 21.6 cu. ft.?

12. What fraction of a cubic yard is 24.3 cu. ft.?

13. What fraction of a cubic yard is 4.5 cu. ft.?

14. What fraction of a cubic yard is 2.7 cu. ft.?

## No. 64

### VOLUMES OF RECTANGULAR SOLIDS

1. Find the volume of a rectangular solid 7 ft. by 5 ft. by 4 ft.

SOLUTION. $1 \text{ cu. ft.} \times 7 \times 5 \times 4 = 140 \text{ cu. ft.}$

2. Find the volume of a rectangular box 3 ft. by 2 ft. by 1 ft.

3. Find the volume of a cube each of whose dimensions is 5 ft.

4. Find the volume of a rectangular solid each of whose dimensions is $1\frac{1}{2}$ ft.

5. Find the volume of a rectangular solid 8 ft. by 6 ft. by 5 ft.

6. How many cubic feet are in a room 16 ft. by 12 ft. and 10 ft. high?

7. Find the number of cubic feet in a cube having 9 in. for an edge.

8. Find the number of cubic feet in a rectangular cistern 30 ft. by 10 ft. and 8 ft deep.

9. How many cubical blocks 2 in. on an edge make 1 cu. ft.?

**10.** How many boxes 3 ft. by 2 ft. and 2 ft. deep will fit in a space 30 ft. long, 20 ft. wide, and 10 ft. high?

**11.** How many cubes $\frac{1}{2}$ in. on an edge will fill a box 3 in. by 2 in. by 1 in.?

**12.** A schoolroom is 30 ft. long, 20 ft. wide, and 12 ft. high. How many cubic feet of air does it contain?

**13.** How many cubic feet are in a piece of timber 12 ft. long, $\frac{3}{4}$ ft. wide, and $\frac{2}{3}$ ft. thick?

**14.** How many cubic feet are in a piece of timber 18 ft. long, $\frac{1}{2}$ ft. wide, and $\frac{1}{3}$ ft. thick?

**15.** How many cubic feet are in a piece of timber 25 ft. long, $\frac{1}{2}$ ft. wide, $\frac{2}{5}$ ft. thick?

## No. 65

### AVOIRDUPOIS WEIGHT

| | |
|---|---|
| 16 ounces (oz.) | = 1 pound (lb.) |
| 100 pounds | = 1 hundredweight (cwt.) |
| 2,000 pounds | = 1 ton (T.) |
| 2,240 pounds | = 1 long ton |
| 1 pound | = 7,000 grains |

Reduce to ounces:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | 3 lb. | 6. | $3\frac{1}{4}$ lb. | 11. | $6\frac{1}{4}$ lb. | 16. | 3 lb. 2 oz. |
| 2. | 9 lb. | 7. | $2\frac{3}{4}$ lb. | 12. | $8\frac{1}{4}$ lb. | 17. | 4 lb. 5 oz. |
| 3. | $1\frac{1}{2}$ lb. | 8. | $\frac{7}{8}$ lb. | 13. | $\frac{2}{3}$ lb. | 18. | 6 lb. 8 oz. |
| 4. | $4\frac{1}{2}$ lb. | 9. | $1\frac{5}{8}$ lb. | 14. | $\frac{2}{9}$ lb. | 19. | 8 lb. 12 oz. |
| 5. | $1\frac{1}{4}$ lb. | 10. | $5\frac{1}{2}$ lb. | 15. | $1\frac{1}{12}$ lb. | 20. | 9 lb. 6 oz. |

Reduce to pounds:

1. $\frac{3}{4}$ cwt.
2. $\frac{1}{8}$ cwt.
3. $\frac{3}{8}$ cwt.
4. $\frac{5}{8}$ cwt.
5. $\frac{7}{8}$ cwt.
6. $\frac{1}{16}$ cwt.
7. $\frac{3}{16}$ cwt.
8. .7 cwt.
9. .9 cwt.
10. .66$\frac{2}{3}$ cwt.
11. .87$\frac{1}{2}$ cwt.
12. .42$\frac{6}{7}$ cwt.
13. $\frac{1}{12}$ T.
14. $\frac{3}{4}$ T.
15. $\frac{3}{8}$ T.
16. .375 T.
17. $\frac{5}{6}$ T.
18. $\frac{1}{2}$ long T.
19. $\frac{1}{4}$ long T.
20. $\frac{3}{4}$ long T.

1. Find the cost of 2$\frac{1}{4}$ T. of hay at $10 a ton.

2. What will 2$\frac{1}{2}$ T. of wheat cost at $28 a ton?

3. If meat costs 12¢ a pound, what will 1 T. cost?

4. Find the value of 4 fat cattle, weighing 1,250 each, at 6¢ a pound.

5. If a ton of hay costs $14, what will 5 cwt. of hay cost? What will 7 cwt. cost?

## No. 66

### CAPACITY

| Liquid Measure | | Dry Measure | |
|---|---|---|---|
| 4 gills (gi.) | = 1 pint (pt.) | 2 pints (pt.) | = 1 quart (qt.) |
| 2 pints | = 1 quart (qt.) | 8 quarts | = 1 peck (pk.) |
| 4 quarts | = 1 gallon (gal.) | 4 pecks | = 1 bushel (bu.) |
| 1 gallon | = 231 cu. in. | 1 bushel | = 2,150.42 cu. in. |

1. How many pints are in 1 gal.? In 3 gal.? In 7 gal.? In 12 gal.?

2. What fraction of a gallon is 1 pt.? 5 pt.? 1 qt. 1 pt.?

**3.** How many pints are in $\frac{3}{4}$ gal.? In $\frac{7}{8}$ gal.? In 3 gal.?

**4.** How many quarts make 1 bu.? $1\frac{1}{2}$ bu.? $1\frac{1}{4}$ bu.?

**5.** How many quarts are in $2\frac{1}{2}$ bu.? In $1\frac{7}{8}$ bu.?

**6.** How many quarts are in .3 bu.? In .5 bu.? In .25 bu.?

**7.** How many quarts are in .9 pk.? In .75 pk.?

**8.** How many quarts are in $.16\frac{2}{3}$ pk.? In. $66\frac{2}{3}$ pk.?

**9.** Reduce to pecks: 2 bu. 6 pk.; 4 bu. 5 pk.; 6 bu. 2 pk.; 7 bu. 7 pk.

**10.** Reduce to quarts: 3 gal. 3 qt.; 5 gal. 2 qt.; 8 gal. 1 qt.

**11.** What fraction of a bushel is 1 pk. 6 qt.?

**12.** What fraction of a bushel is 2 pk. 4 qt.?

**13.** What fraction of a bushel is 3 pk. 6 qt.?

**14.** What fraction of a gallon is 77 cu. in.?

**15.** What fraction of a gallon is 154 cu. in.?

**16.** A tin box is 11 in. long, 7 in. wide, and 6 in. deep. How many gallons will it hold?

**17.** When milk sells at 3¢ a pint, what is the cost of milk per gallon?

**18.** When pecans sell for 6¢ a quart, what is the value of 1 bu. of pecans?

**19.** When tomatoes sell for 7¢ a quart, what will 1 bu. of tomatoes cost?

## No. 67

### TIME MEASURE

| | |
|---|---|
| 60 seconds (sec.) | = 1 minute (min.) |
| 60 minutes | = 1 hour (hr.) |
| 24 hours | = 1 day (da.) |
| 7 days | = 1 week (wk.) |
| 30 days | = 1 commercial month (mo.) |
| 365 days | = 1 common year (yr.) |
| 366 days | = 1 leap year |

Omitting centennial years, a year is a leap year if it is exactly divisible by 4. Centennial years are leap years, if they are exactly divisible by 400.

Reduce to minutes:

1. $\frac{3}{4}$ hr.
2. $\frac{5}{6}$ hr.
3. $\frac{5}{12}$ hr.
4. $\frac{7}{12}$ hr.
5. $\frac{11}{12}$ hr.
6. $\frac{2}{15}$ hr.
7. $\frac{7}{15}$ hr.
8. $\frac{11}{15}$ hr.
9. $\frac{13}{15}$ hr.
10. $\frac{9}{20}$ hr.
11. $1\frac{1}{2}$ hr.
12. $1\frac{2}{3}$ hr.
13. $3\frac{1}{2}$ hr.
14. $5\frac{2}{3}$ hr.
15. $4\frac{3}{4}$ hr.
16. 1 hr. 23 min.
17. 2 hr. 18 min.
18. 2.7 hr.
19. 3.9 hr.
20. 5.25 hr.
21. 7.75 hr.

What fraction of an hour is:

1. 16 min.?
2. 24 min.?
3. 36 min.?
4. 44 min.?
5. $6\frac{2}{3}$ min.?
6. $33\frac{1}{3}$ min.?
7. $4\frac{1}{2}$ min.?
8. $22\frac{1}{2}$ min.?
9. 54 min.?
10. 42 min.?
11. 18 min.?
12. $8\frac{4}{7}$ min.?
13. $17\frac{1}{7}$ min.?
14. $52\frac{1}{2}$ min.?
15. $37\frac{1}{2}$ min.?

Reduce to hours:

1. $\frac{3}{4}$ da.
2. $\frac{3}{8}$ da.
3. $\frac{7}{8}$ da.
4. $\frac{7}{12}$ da.
5. $\frac{11}{12}$ da.
6. $\frac{1}{16}$ da.
7. $\frac{3}{16}$ da.
8. $\frac{5}{16}$ da.
9. $\frac{2}{5}$ da.
10. $1\frac{1}{2}$ da.
11. $3\frac{1}{2}$ da.
12. $2\frac{3}{4}$ da.
13. $8\frac{1}{6}$ da.
14. 4 da. 10 hr.
15. 6 da. 6 hr.
16. 2 wk.
17. 3 wk. 1 da.
18. 1 wk. 5 da.

What fraction of a day is:

1. 16 hr.?
2. 20 hr.?
3. $22\frac{1}{2}$ hr.?
4. $13\frac{1}{2}$ hr.?
5. $16\frac{1}{2}$ hr.?
6. 6.4 hr.?
7. 9.6 hr.?
8. 30 min.?
9. 45 min.?
10. 21.6 hr.?
11. 30 hr.?
12. 42 hr.?

1. How many days were in the first 3 months of the year 1903?

2. How many days are in the 3 months, July, August, and September?

3. How many days are in the 3 months, November, December, and January?

4. How many days were in the 3 years, 1898, 1899, and 1900?

5. How many days were in the 3 years, 1896, 1897, and 1898?

6. How many days are in $\frac{1}{5}$ of a common year?

7. How many days are in $\frac{2}{5}$ of a common year?

8. How many days are in $\frac{3}{5}$ of a common year?

9. How many days are in $\frac{4}{5}$ of a common year?

10. How many days are in $\frac{1}{2}$ of a leap year?

11. How many days are in 4 successive centuries?

12. What fraction of a minute is 40 sec.?

13. What fraction of a minute is 50 sec.?

14. What fraction of a minute is 24 sec.?

15. What fraction of a minute is 25 sec.?

## No. 68

### CIRCULAR MEASURE

60 seconds (″) = 1 minute (′)
60 minutes = 1 degree (°)
90 degrees = 1 quadrant
360 degrees = 1 circumference

### ANGULAR MEASURE

60 seconds (″) = 1 minute (′)
60 minutes = 1 degree (°)
90 degrees = 1 right angle
180 degrees = 1 straight angle

1. The Tropic of Cancer is $23\frac{1}{2}°$ north of the Equator, and the Tropic of Capricorn is $23\frac{1}{2}°$ south of the Equator. How many degrees is it from Capricorn to Cancer?

2. The Arctic Circle is $66\frac{1}{2}°$ north of the Equator. How many degrees north of Cancer is the Arctic Circle?

3. The North Pole is 90° north of the Equator. How many degrees are there from the Arctic Circle to the North Pole?

4. How many degrees are there from the North Pole to the Tropic of Cancer?

5. How many degrees are between the North Pole and the Tropic of Capricorn?

6. How many degrees are between the North Pole and the Antarctic Circle?

7. How many degrees are between the Arctic Circle and the Tropic of Capricorn?

8. How many degrees are between the Arctic Circle and the Antarctic Circle?

9. How many degrees are between the Tropic of Cancer and the Antarctic Circle?

10. The Arctic Expedition, under E. R. Kane, reached, in June, 1854, a point whose latitude is 80° 10′ north. How many degrees and minutes is this point from the North Pole?

11. The Greely Expedition reached, in May, 1882, a point in north Greenland whose latitude is 83° 24′ north. How many degrees and minutes is this point from the North Pole?

12. The Peary Expedition reached, in April, 1902, a point north of Grinnell Land whose latitude is 84° 17′ north. How many degrees and minutes is this point from the North Pole?

**13.** The latitude of Austin, Texas, is 30° 17′ north. The latitude of Lincoln, Nebraska, is 40° 49′ north. How many degrees and minutes farther north is Lincoln than Austin?

**14.** The latitude of New Orleans, Louisiana, is 30° north. The latitude of Portland, Maine, is 43° 39′ north. How many degrees and minutes farther from the Equator is Portland than New Orleans?

**15.** The longitude of Bismarck, North Dakota, is 100° 47′ west. The longitude of Philadelphia, Pennsylvania, is 75° 10′ west. How many degrees and minutes farther west is Bismarck than Philadelphia?

**16.** Two persons start from the same place; one goes 175° east and the other 175° west. How many degrees apart are they?

**1.** How many degrees are in $\frac{3}{4}$ of a right angle?

**2.** The 3 angles of a triangle are together equal to 2 right angles. If the 3 angles are equal to one another, what fraction of a right angle is each angle?

**3.** If one angle of a triangle is equal to $\frac{5}{6}$ of a right angle, to how many right angles are the remaining two angles equal?

**4.** What fraction of a right angle is $22\frac{1}{2}°$? $67\frac{1}{2}°$?

**5.** What fraction of a right angle is 72°? 54°? $33\frac{3}{4}°$?

## ENGLISH MONEY

### No. 69

12 pence (*d.*) = 1 shilling (*s.*)
20 shillings = 1 pound (£.)

One fourth penny is called a farthing. The guinea is 21*s.* There is no coin representing a guinea.

1. How many pence make £1 sterling?
2. How many shillings are in £1 10*s.*?
3. What fraction of £1 is 3*s.* 4*d.*?
4. What fraction of £1 is 6*s.* 8*d.*?
5. What fraction of £1 is 13*s.* 4*d.*?
6. What fraction of £1 is 11*s.*?
7. What fraction of £1 is 17*s.*?
8. What fraction of £1 is 11*s.* 8*d.*?

Reduce to shillings:

1. £ 2 10*s.*
2. £ 3 12*s.*
3. £ 5 8*s.*
4. £10 12*s.*
5. £12 10*s.*
6. £15 15*s.*
7. £14 15*s.*
8. £16 8*s.*
9. £12 18*s.*
10. £11 11*s.*
11. £13 15*s.*
12. £17 5*s.*

Reduce to the decimal of £1:

1. 1*s.*
2. 3*s.*
3. 5*s.*
4. 7*s.*
5. 9*s.*
6. 12*s.*
7. 14*s.*
8. 17*s.*
9. 18*s.*
10. 19*s.*
11. 12*s.*
12. 16*s.*
13. 7*s.* 6*d.*
14. 10*s.* 6*d.*
15. 14*s.* 6*d.*
16. 6*s.* 8*d.*

## RATIO

### No. 70

1. How large is 1 ft. compared with 1 yd.?
2. How large is 1 in. compared with 1 ft.?
3. How large is 5 in. compared with 1 ft.?
4. How large is 1 qt. compared with 1 gal.?
5. How large is 3 qt. compared with 1 gal.?
6. How large is 1 qt. compared with 1 pk.?
7. How large is 3 qt. compared with 1 pk.?
8. How large is 1 min. compared with 1 hr.?
9. How large is 5 min. compared with 1 hr.?
10. How large is 15 min. compared with 1 hr.?
11. How large is 45 min. compared with 1 hr.?
12. How large is 3 mo. compared with 1 yr.?
13. How large is 5 mo. compared with 1 yr.?
14. How large is 1 da. compared with 1 wk.?
15. How large is 3 da. compared with 1 wk.?
16. How large is 2 yd. compared with 5 yd.?
17. How large is 3 yd. compared with 7 yd.?
18. How large is 9 in. compared with 12 in.?

19. How large is 10¢ compared with $1?
20. How large is 25¢ compared with $1?
21. How large is 60¢ compared with $1?
22. How large is 80¢ compared with $1?
23. How large is 7 compared with 12?
24. How large is 8 compared with 20?
25. How large is 18 compared with 30?

The **ratio** of one quantity to another quantity of the same kind is the quotient obtained by dividing the first quantity by the second quantity.

When two quantities are compared as to size, the result of this comparison is called **ratio.**

What is the ratio of:

1. 4 in.: 12 in.?
2. 8 in.: 28 in.?
3. 10 in.: 16 in.?
4. 6 qt.: 8 qt.?
5. $1\frac{1}{2}$ ft.: 1 yd.?
6. 12 yd.: 20 yd.?
7. 9 yd.: 6 yd.?
8. 12 yd.: 8 yd.?
9. 15¢: $1?
10. 30¢: $1?
11. 45¢: $1?
12. 40¢: $1?
13. 75¢: $1?
14. $1.50: $1?
15. $2.50: $1.40?
16. 24 min.: 1 hr.?
17. 54 min.: 1 hr.?
18. 16 hr.: 1 da.?
19. 18 hr.: 1 da.?
20. $1\frac{1}{3}$: $1\frac{2}{3}$?

1. Divide $100 between two persons in the ratio 2 : 3.

SOLUTION. This means that one person is to get $2 as often as the other person gets $3, or that one person is to get $2 out of every $5 in the sum to be divided, and that the other person is to get $3 out of every $5 in the sum to be divided. In other words, the first person gets $\frac{2}{5}$ of the $100, and the second person gets $\frac{3}{5}$ of the $100.

$\frac{2}{5}$ of $100 = $40.

$\frac{3}{5}$ of $100 = $60. *Ans.* $40, $60.

2. Divide $90 in the ratio 3 : 5.

3. Divide $150 in the ratio 3 : 2.

4. Divide $350 in the ratio 3 : 4.

5. Divide $400 in the ratio 3 : 5.

6. Divide $650 in the ratio 5 : 8.

7. Divide $1,000 in the ratio 9 : 11.

8. Divide a herd of 2,500 cattle between two men in the ratio 3 : 7.

9. A man divides a farm consisting of 840 A. between a son and a daughter in the ratio 5 : 7. How many acres does each receive?

10. A and B own a sugar mill. A's capital is to B's in the ratio 4 : 9. If the mill is valued at $26,000, find the capital of each.

11. If the profits on the above sugar mill the first year were $1,950, and the profits were divided in the

ratio of the investments, find A's share of the profits. Find B's share.

**12.** Two men engage in business; they gain during the year $3,000. If the gain is divided in the ratio 7: 8, what is each man's gain?

**13.** Three men, A, B, and C, own a rice mill valued at $21,000. If their investments in the mill are in proportion to the numbers, 5, 7, 9, find each man's investment in the mill.

**14.** A man invests $2,400 in a business enterprise; he gains $600. What is the ratio of his gain to his investment?

**15.** If a man invests $1,200 in a business and gains $240, how much does he gain on each dollar invested? How much does he gain on every $100 invested?

**16.** A man's property is assessed for taxation at $3,000. If the tax rate is $1\frac{1}{2}¢$ on the $1, how much taxes does he pay?

**17.** If a man's property is assessed for taxation at $3,600, and the tax rate is $2¢$ on the dollar, how much taxes does he pay?

**18.** A lawyer charges $5¢$ on $1 for collecting a debt. The amount of the debt is $7,200. Find the lawyer's fee.

**19.** A real estate agent charges $4¢$ on $1 for selling property. Find his commission on sales amounting to $2,500.

## ANALYTIC WORK

### No. 71

**1.** Find the cost of 4 lb. of tea, if 3 lb. cost $1.65.

SOLUTION. 3 lb. cost $1.65.

Therefore, 1 lb. costs $\frac{1}{3}$ of $1.65.

$\frac{1}{3}$ of $1.65 = 55¢$.

Therefore, 4 lb. cost 4 times $55¢$.

$55¢ \times 4 = \$2.20$. *Ans.* $2.20.

**2.** What will 6 A. of land cost, if 5 A. cost $300?

**3.** What will 7 cows cost, if 6 cows cost $270?

**4.** If 7 sheep cost $42, what will 3 sheep cost?

**5.** If 3 doz. chickens cost $10.50, what will 5 doz. cost?

**6.** If a train runs 105 mi. in 3 hr., at this rate how far will it run in 7 hr.?

**7.** If 3 head of cattle eat 6 T. of hay during the winter, at this rate how many tons will 11 head of cattle eat in the same time?

**8.** If I pay $85¢$ for 5 gal. of kerosene oil, how much should I pay for 11 gal.?

**9.** If 6 turkeys sell for $7.50, at this rate find the price of 9 turkeys.

**10.** Three mules sell for $255. How much should 4 such mules sell for?

**11.** If I pay $13.50 for 9 copies of a book, what should I pay for 12 copies of the same book?

**12.** If two teams plow a 27-acre field in one week, how large a field should 5 teams plow in one week?

**13.** If 5 doz. eggs cost $1.25, what will 8 doz. eggs cost?

**14.** If 7 ducks cost $2.94, what should 1 doz. ducks cost at the same rate?

**15.** If 5 yd. of cloth cost $4.90, find the price of 8 yd. of this cloth.

**16.** When 8 bbl. of apples sell for $14, what should 10 bbl. of apples of the same kind sell for?

**17.** If 9 bu. of wheat sell for $7.20, what should 13 bu. of wheat sell for?

**18.** If 9 bu. of barley sell for $4.05, what should 11 bu. of barley sell for?

**19.** If I pay $8.75 for 5 chairs, what should I pay for 1 doz. of these chairs?

**20.** If I pay $8 for 20 yd. of matting, at this rate what will I pay for 50 yd. of matting?

## No. 72

1. If 3 masons build a wall in 12 da., how long will it take 4 masons to build a wall of the same size?

SOLUTION. It will take 1 mason 3 times as long to build the wall as it takes 3 masons to build the wall.

Therefore, it will take 1 mason 36 da. to build the wall.

It will take 4 masons $\frac{1}{4}$ as long to build the wall as it takes 1 mason.

Therefore, it will take 4 masons 9 da. to build the wall.

2. Three men dig a garden in 10 hr. How long will it take 5 men to dig the same garden?

3. If 4 masons build a wall in 9 da., how long will it take 9 masons to build a wall equally large?

4. If 5 teams plow a field in 8 da., how long will it take 8 teams to plow the same field?

5. If 15 men pave a street in 12 da., how long will it take 18 men to pave the same street?

6. Twelve horses eat a quantity of hay in 7 da. How long will the same quantity of hay last 8 horses?

7. A garrison consisting of 1,500 men has provisions for 4 wk. If the garrison is reënforced by 500 men, how long will the provisions last?

**8.** How long will a quantity of feed last 18 horses, if it lasts 10 horses 9 da.?

**9.** If 4 men plant a number of trees in 18 hr., how long will it take 9 men to plant the same number of trees?

**10.** If 3 men pave a walk in 8 da., how long will it take 4 men to do the same work?

**11.** If a man rows down stream in 5 hr. at the rate of 5 mi. an hour, how long will it take him to row back at the rate of 4 mi. an hour?

**12.** If 12 carpenters build a house in 15 da., how long will it take 10 carpenters to build the same house?

**13.** Four men dig a cellar in 6 da. How long will it take 6 men to dig such a cellar?

**14.** Three men husk a field of corn in 7 da. How long will it take 4 men to husk the corn in a field equally large?

**15.** Eight boys pick a field of cotton in 6 da. How long will it take 12 boys to pick the same field of cotton?

**16.** Five mowers cut a meadow in 9 hr. How long will it take 3 mowers to cut a meadow of this size?

**17.** A train runs at the rate of 30 mi. an hour, and performs a certain journey in 6 hr. How long will it take a freight train to perform the same journey, if its rate is 24 mi. an hour?

**18.** A bicyclist rides at the rate of 8 mi. an hour for $1\frac{1}{2}$ hr. How long will it take a person walking at the rate of 4 mi. an hour to go the same distance?

**19.** If twice A's money is equal to five times B's money, and B has \$50, how much money has A?

**20.** Five men or 8 boys do a piece of work in 10 da. If a boy's wages is \$1.25 per day, what is a man's wages per day?

**1.** Seven eighths of a peck of potatoes cost 28¢. Find the cost of 1 pk. of potatoes.

Find the cost of 1 bu. of potatoes.

SOLUTION. $\frac{7}{8}$ of a peck cost 28¢.

Therefore, $\frac{1}{8}$ of a peck cost $28¢ \div 7$.

Therefore, $\frac{8}{8}$ of a peck cost $28¢ \div 7 \times 8 = 32¢$.

*Ans.* 32¢.

Therefore, 1 bu. costs $32¢ \times 4 = \$1.28$.

*Ans.* \$1.28.

**2.** If $\frac{2}{3}$ of a yard of ribbon cost 16¢, what will 1 yard of ribbon cost? What will 5 yd. cost? What will $\frac{3}{4}$ of a yard cost?

**3.** When $\frac{3}{5}$ of a yard of silk cost 90¢, what will 1 yd. of silk cost? What will 3 yd. of silk cost? What will $\frac{2}{3}$ of a yard of silk cost?

**4.** If $\frac{3}{4}$ of a pound of tea cost 42¢, what will 1 lb. of tea cost? What will 5 lb. of tea cost? What will $\frac{1}{2}$ lb. of tea cost?

**5.** Two ninths of the number of pages in a book is 80 pages. How many pages are in the book? How many pages are in $\frac{3}{4}$ of the book?

**6.** Five eighths of the value of a ton of hay is \$6.25. At this rate, what is the value of a ton of hay?

**7.** Two fifths of a barrel of apples is worth 70¢. Find the value of a barrel of apples. Find the value of 3 bbl. of apples. Find the value of $\frac{1}{2}$ bbl. of apples.

**8.** After using $\frac{3}{5}$ of a barrel of flour, there are 80 lb. of flour in the barrel. How many pounds of flour were in the barrel at first?

**9.** After taking out of a schoolroom $\frac{2}{7}$ of the desks there were 40 desks left in the room. How many desks were in the room at first?

**10.** A man spent $\frac{2}{11}$ of his money and then had \$135. How much money had he originally?

**11.** A ranchman sold $\frac{3}{7}$ of his herd of cattle and then had 320 cattle. How many cattle did he have in his herd originally?

**12.** A trader sold $\frac{4}{9}$ of a number of mules, and then had 65 mules to sell. How many mules did he sell?

**13.** A farmer uses $\frac{1}{2}$, then $\frac{1}{3}$ of his crib of corn, and then has left over 150 bu. How many bushels had he at first?

**14.** If I spend $\frac{1}{3}$ of my money and \$80, and have nothing left, how much money had I?

**15.** A commission merchant sold $\frac{3}{7}$ of a consignment of cotton, and still has 280 bales. How many bales were in the consignment?

**16.** A commission merchant sells, on Monday, $\frac{3}{8}$ of a consignment of wheat, and on Tuesday he sells $\frac{1}{3}$ as much as he did on Monday. If he has 10,000 bu. of the wheat remaining, how many bushels were in the consignment? How many bushels did he sell on Monday? How many bushels did he sell on Tuesday?

**17.** A boy sells at one time $\frac{2}{9}$ of the number of his chickens and at another time he sells 12 chickens; he then has $\frac{1}{3}$ of the original number of chickens. How many chickens had he at first?

**18.** Express the following decimals as common fractions:

$.37\frac{1}{2}$, $.87\frac{1}{2}$, $.16\frac{2}{3}$, $.33\frac{1}{3}$, $.11\frac{1}{9}$, $.08\frac{1}{3}$, $.83\frac{1}{3}$.

**19.** Thirty-seven and one half hundredths of the number of acres in a farm amounts to 210 A. How many acres are in the farm?

**20.** Eighty-three and one third hundredths of a man's property is \$2,500. What is the value of his property?

**21.** A man insures his house for $.62\frac{1}{2}$ of its value. If the amount of his policy is \$5,000, what is the value of his house?

**22.** A man's property is assessed at $.66\frac{2}{3}$ of its actual value. If the assessed valuation is \$1,800, what is the value of his property?

**23.** After spending $.11\frac{1}{9}$ of his money, a man had \$80 left. How much money had he?

**24.** A man loses in business $.12\frac{1}{2}$ of his investment and then has \$3,500. Find his investment.

**25.** After gaining $.16\frac{2}{3}$ of a sum of money I had \$2,800. How much money had I at first?

**26.** A real estate agent charges $.08\frac{1}{3}$ of his collections as a commission for collecting rents. If he remits \$5,500 to his principal, what is the total amount of rent collected?

**27.** After increasing his capital by $.33\frac{1}{3}$ of itself, a man then has a capital of \$6,400. Find his original capital.

**28.** A lawyer charges $.06\frac{1}{4}$ of a debt for collecting it. If the lawyer remits \$7,500 to his client, find the amount of the debt.

# PERCENTAGE

## No. 73

Computation on the basis of 100 is called **percentage.**

1. If a man engages in business and gains $1 on every $2 he invests, how many dollars does he gain on every $100 he invests?

2. If a man engages in business and makes a profit of $1 on every $3 invested, how many dollars does he gain on $100 invested?

3. On a rainy day one pupil out of every four is absent from school. How many pupils are absent out of every 100 pupils?

4. On an examination, a student fails to answer 1 question out of 5 questions. At this rate, how many questions would he fail to answer out of 100 questions?

5. One eighth of the population of a certain city is foreign-born. How many foreign-born persons are in every 100 of the population?

6. If a merchant makes a profit of $1 on every $10 invested, what is his profit on every $100 invested?

7. If the same merchant makes a profit of $1 on every $20 invested, what is his profit on every $100 invested?

8. A man invests some money in street railway stocks. If his investment brings him $1 on every $25 he invests, how much does this stock pay on every $100 invested?

9. A man invests his money in bank stock. If the stock pays $4 on every $50 invested, how much does it pay on every $100 invested?

10. Oil stock pays $3 on every $25 invested in it. What does oil stock pay on every $100 invested in it?

## No. 74

**Per cent** means by the 100, or on the 100.

Thus, 6% means 6 on 100, or 6 in 100, or 6 out of 100.

25% means 25 out of 100, or 25 in 100, or 25 on 100.

If a merchant sells canned goods at a profit of $\frac{1}{8}$ of the cost price, what is his rate per cent of profit?

SOLUTION. On $1 he gains $\$\frac{1}{8}$.

Therefore, on $100 he gains $\$\frac{100}{8}$, or $\$12\frac{1}{2}$.

Therefore, the rate of gain is $12\frac{1}{2}\%$.

Find the rate per cent of gain, or loss, if the gain or loss is:

1. $\frac{1}{2}$ of the cost.
2. $\frac{1}{3}$ of the cost.
3. $\frac{1}{4}$ of the cost.
4. $\frac{3}{4}$ of the cost.
5. $\frac{1}{5}$ of the cost.
6. $\frac{2}{5}$ of the cost.
7. $\frac{3}{5}$ of the cost.
8. $\frac{4}{5}$ of the cost.
9. $\frac{1}{6}$ of the cost.
10. $\frac{5}{6}$ of the cost.
11. $\frac{1}{7}$ of the cost.
12. $\frac{2}{7}$ of the cost.
13. $\frac{3}{7}$ of the cost.
14. $\frac{4}{7}$ of the cost.
15. $\frac{6}{7}$ of the cost.
16. $\frac{1}{8}$ of the cost.
17. $\frac{3}{8}$ of the cost.
18. $\frac{5}{8}$ of the cost.
19. $\frac{7}{8}$ of the cost.
20. $\frac{1}{9}$ of the cost.
21. $\frac{2}{9}$ of the cost.
22. $\frac{5}{9}$ of the cost.
23. $\frac{4}{9}$ of the cost.
24. $\frac{1}{10}$ of the cost.
25. $\frac{3}{10}$ of the cost.
26. $\frac{4}{10}$ of the cost.
27. $\frac{7}{10}$ of the cost.
28. $\frac{9}{10}$ of the cost.
29. $\frac{1}{12}$ of the cost.
30. $\frac{5}{12}$ of the cost.
31. $\frac{1}{16}$ of the cost.
32. $\frac{1}{20}$ of the cost.
33. $\frac{3}{20}$ of the cost.
34. $\frac{7}{20}$ of the cost.
35. $\frac{9}{20}$ of the cost.
36. $\frac{11}{20}$ of the cost.
37. $\frac{13}{20}$ of the cost.
38. $\frac{17}{20}$ of the cost.
39. $\frac{19}{20}$ of the cost.
40. $\frac{1}{25}$ of the cost.
41. $\frac{3}{25}$ of the cost.
42. $\frac{4}{25}$ of the cost.
43. $\frac{6}{25}$ of the cost.
44. $\frac{7}{25}$ of the cost.
45. $1\frac{1}{2}$ times the cost.
46. $1\frac{1}{3}$ times the cost.
47. $1\frac{1}{4}$ times the cost.
48. $1\frac{2}{5}$ times the cost.
49. $1\frac{1}{6}$ times the cost.
50. $1\frac{3}{4}$ times the cost.

## No. 75

What fraction of a number is:

1. 50% of the number?
2. 40% of the number?
3. 60% of the number?
4. 80% of the number?
5. 90% of the number?
6. 25% of the number?
7. 75% of the number?
8. $16\frac{2}{3}$% of the number?
9. $33\frac{1}{3}$% of the number?
10. $66\frac{2}{3}$% of the number?
11. $83\frac{1}{3}$% of the number?
12. $14\frac{2}{7}$% of the number?
13. $28\frac{4}{7}$% of the number?
14. $12\frac{1}{2}$% of the number?
15. $37\frac{1}{2}$% of the number?
16. $62\frac{1}{2}$% of the number?
17. $87\frac{1}{2}$% of the number?
18. 10% of the number?
19. 20% of the number?
20. $8\frac{1}{3}$% of the number?
21. $41\frac{2}{3}$% of the number?
22. $58\frac{1}{3}$% of the number?
23. $91\frac{2}{3}$% of the number?
24. 8% of the number?
25. 4% of the number?
26. $3\frac{1}{3}$% of the number?
27. 5% of the number?
28. 125% of the number?
29. 150% of the number?
30. 175% of the number?
31. 120% of the number?
32. $116\frac{2}{3}$% of the number?
33. $133\frac{1}{3}$% of the number?
34. 225% of the number?
35. 350% of the number?
36. 475% of the number?
37. 420% of the number?
38. 580% of the number?
39. 360% of the number?
40. 1,050% of the number?

## No. 76

What is 1% of $750?

SOLUTION. 1% of $750 = $\frac{1}{100}$ of $750 = $7.50.

Find 1% of:

1. $1,000, $2,500, $5,000, $6,500, $7,800, $9,600.

2. $560, $920, $780, $840, $756, $924, $518.

3. $48, $76, $83, $19, $91, $79, $11, $8, $17.

Find 2% of $756.

SOLUTION. 1% of $756 = $7.56.

Therefore, 2% of $756 = $7.56 × 2 = $15.12.

Find 2% of:

4. $2,000, $3,000, $5,500, $7,500, $9,000, $10,200, $12,000.

5. $360, $850, $940, $770, $880, $540, $430, $210.

6. $315, $425, $675, $890, $125, $214, $381, $527, $810.

Find 3% of:

7. $1,500, $4,000, $7,000, $7,500, $4,900, $5,100, $6,700.

8. $225, $375, $425, $950, $650, $150, $525, $875, $975.

9. $118, $224, $351, $411, $514, $618, $723, $821, $917.

Find 4% of:

10. $1,000, $1,500, $1,800, $2,000, $2,500, $3,000, $3,300.

11. $3,500, $4,200, $4,500, $4,800, $5,000, $5,400, $5,500.

12. $450, $550, $625, $825, $950, $114, $127, $221, $314.

Find 5% of:

13. $1,500, $1,800, $2,300, $3,200, $3,800, $4,600, $5,400.

14. $1,200, $940, $215, $325, $440, $580, $660, $880, $960.

Find 6% of:

15. $900, $2,100, $3,400, $4,200, $6,400, $7,500, $8,500.

16. $60, $90, $85, $40, $340, $440, $760, $290, $325.

17. A man has $7,200 invested in bank stock. If the stock pays a dividend of 4%, how much does his investment pay?

18. A farmer had 2,500 bu. of corn, and sold 9% of it. How many bushels did he sell?

19. 8% of a farm, consisting of 640 A., is planted in corn. How many acres are planted in corn?

20. 7% of a farm, consisting of 859 A., is planted in cotton. How many acres are planted in cotton?

21. A real estate agent charges 6% commission for collecting rent. What is his commission on $7,500 rents collected?

22. A lawyer collects a debt amounting to $4,200, and he charges a fee of 6%. Find his fee.

23. A man bought a stock of merchandise valued at $1,250. If he sells it at a profit of 10%, find his profit.

24. A farmer bought a horse for $85 and sold him at a profit of 8%. Find the number of dollars he made and the selling price of the horse.

25. A dealer bought 100 hogs at $8 apiece. If he sold the hogs at a profit of 10%, how much did he make? What was the selling price of the 100 hogs?

26. A fruit dealer buys 100 boxes of oranges at $1.60 a box and sells them at a gain of 40%. What does he make by the transaction? What is the selling price, per box, of the oranges?

27. A commission merchant buys eggs at 20¢ a dozen and sells them at a profit of 25%. Find the selling price per dozen of the eggs.

28. A speculator buys a house and lot for $3,200 and sells them at a profit of 5%. What does he make? What is the selling price?

29. The population of a city is 50,000; 9% of this population can neither read nor write. How many in the city can neither read nor write?

**30.** The population of a city is 40,000; of this number 20% are registered voters. How many voters are in the city?

**31.** Straw hats cost the dealer \$1.60; he sells these at a profit of 25%. Find the selling price of the hats.

**32.** A dry goods merchant buys 500 yd. of silk at \$1.50 a yard and sells it at a profit of $33\frac{1}{3}\%$. How much does he make on the 500 yd. of silk? What is the selling price per yard of this silk?

**33.** A commission merchant sells a bale of cotton, weighing 500 lb., at 8¢ a pound. If he charges 2% commission for selling it, find the amount of his commission.

**34.** A piano is bought for \$240 and sold at a profit of 20%. Find the selling price of the piano.

**35.** An implement dealer buys reapers at \$120 apiece and sells them at a profit of $12\frac{1}{2}\%$. Find the profit and the selling price.

**36.** A bookseller sells books at a profit of 10%. Find his profit on a book which costs him 50¢.

**37.** Razors are bought at \$1.50 apiece and sold at a profit of $16\frac{2}{3}\%$. Find the selling price of a razor.

**38.** A hardware merchant buys a number of knives at \$6 a dozen, and he sells them at 25% profit. Find the selling price, per dozen, of the knives. Find the merchant's profit on 10 dozen knives.

**39.** Gasoline stoves are bought for \$12 apiece and sold at a profit of $33\frac{1}{3}\%$. Find the selling price of a stove. Find the profit on 10 stoves.

**40.** The population of a certain city was 42,000. In 10 yr. the population increased $16\frac{2}{3}\%$. Find the increase in population. Find the population at the end of the 10 yr.

**41.** Flour is bought at \$3.50 a barrel and sold at a profit of 10%. Find the selling price per barrel of flour.

**42.** A clerk earns a salary of \$75 a month. If he saves 30% of his salary, how much money does he save in a year?

**43.** A bookkeeper earns a salary of \$90 a month. If he spends 40% of his salary, how much does he spend a month? How much does he spend in 1 year?

**44.** If I buy a horse for \$80 and sell him at a loss of $12\frac{1}{2}\%$, how much do I lose? Find the selling price of the horse.

**45.** Green Mountain refrigerators cost a merchant \$15 each, and he sells them at a profit of 20%. How much does he make? Find the selling price of Green Mountain refrigerators.

**46.** In a certain grade there are 40 pupils; 45% of this number are boys. How many boys are in the grade?

**47.** In a certain city the school year is 180 da. How many days does a boy attend school whose per cent of attendance is 80?

**48.** If an apple orchard yields 360 bbl. of apples and $66\frac{2}{3}\%$ are sold, how many barrels of apples are sold? How many barrels are unsold?

**49.** A ranchman had 1200 sheep; $5\frac{1}{2}\%$ of them were killed in a blizzard. How many did he lose?

**50.** A farm contains 900 A.; 10% of it is planted in corn, 20% of it is planted in cotton, 5% of it is planted in wheat. Find the number of acres planted in corn, cotton, and wheat.

**51.** What must tea be sold for which is bought at 48¢ a pound so that a profit of $33\frac{1}{3}\%$ may be made?

**52.** Find the selling price of a book which cost \$1.50 so that a profit of $66\frac{2}{3}\%$ may be made.

**53.** Find the selling price, per ton, of coal which cost the dealer \$4.20 a ton, if a profit of 25% is made.

**54.** A man buys a house and lot for \$2,400 and sells them at a loss of 5%. Find the selling price of the house and lot.

**55.** A dealer buys turkeys at \$21 a dozen and sells them at a loss of $16\frac{2}{3}\%$. Find the selling price of these turkeys per dozen.

**56.** A dealer buys eggs at 30¢ a dozen and sells them at a loss of $16\frac{2}{3}\%$. Find the selling price of these eggs per dozen.

**57.** A man buys a tract of land for \$3,600 and sells it at a profit of $83\frac{1}{3}\%$. Find the selling price of the tract of land.

**58.** A man is hired for 90 days; he is sick 20 % of his time. If he works the remaining portion of the time, how many days does he work?

**59.** The school year is 170 da.; a boy was absent 10 % of the number of days in the session. How many days was he present?

**60.** A man had \$720 deposited in bank. He drew out 25 %. How much money has he in bank?

**61.** A man has \$8,000 invested in real estate. If the value of his real estate depreciates 10 %, what is then the value of his investment?

**62.** A man invests \$9,000 in cotton. If the price of cotton rises 8 %, what is then the value of the cotton?

**63.** An organ is bought for \$750 and sold at a profit of $16\frac{2}{3}\%$. Find the selling price of the organ.

## No. 77

Memorize:

$12\frac{1}{2}\%$ of a number $= \frac{1}{8}$ of the number.
$16\frac{2}{3}\%$ of a number $= \frac{1}{6}$ of the number.
$20\%$ of a number $= \frac{1}{5}$ of the number.
$25\%$ of a number $= \frac{1}{4}$ of the number.
$33\frac{1}{3}\%$ of a number $= \frac{1}{3}$ of the number.
$37\frac{1}{2}\%$ of a number $= \frac{3}{8}$ of the number.

40 % of a number = $\frac{2}{5}$ of the number.
50 % of a number = $\frac{1}{2}$ of the number.
60 % of a number = $\frac{3}{5}$ of the number.
$66\frac{2}{3}$ % of a number = $\frac{2}{3}$ of the number.
75 % of a number = $\frac{3}{4}$ of the number.
80 % of a number = $\frac{4}{5}$ of the number.
$87\frac{1}{2}$ % of a number = $\frac{7}{8}$ of the number.
100 % of a number = the number itself.

If 7 % of a number is 245, what is the number?

SOLUTION. 7 % of the number = 245.
Therefore, 1 % of the number = $\frac{245}{7}$.
Therefore, 100 % of the number = $\frac{245 \times 100}{7} = 3{,}500$.

What is the number if:

1. 4 % of it = 24?
2. 5 % of it = 35?
3. 6 % of it = 18?
4. 7 % of it = 49?
5. 8 % of it = 56?
6. 8 % of it = 63?
7. 10 % of it = 27?
8. 8 % of it = 84?
9. 6 % of it = 45?
10. 7 % of it = 665?
11. 5 % of it = 22.5?
12. 6 % of it = 21?
13. 8 % of it = 51.2?
14. 9 % of it = 21.6?
15. 7 % of it = 17.5?
16. 4 % of it = 21?
17. 3 % of it = 24.3?
18. 2 % of it = .5?

**19.** A farmer sold 140 bu. of potatoes; this was 35% of his entire crop. How many bushels of potatoes did he raise?

**20.** By selling a piano at a profit of $36 I gain 6% of the cost of the piano. What did the piano cost?

**21.** A farmer plants 32 A. in corn. If this is 5% of the number of acres in his farm, how many acres are in his farm?

**22.** By selling a horse at a profit of $30, I gain 20% of the cost. What did the horse cost?

**23.** A farmer sold in one week $33\frac{1}{3}\%$ of his apples. If he sold 340 bbl. of apples, how many barrels of apples did he raise?

**24.** An agent charges 6% for collecting rents. If his commissions amount to $540, find the amount of rents collected.

**25.** A house is sold at a profit of $680. If this is 17% of the cost price of the house, what did the house cost?

**26.** By selling cloth at a profit of 2¢ a yard, a merchant realizes a profit of 20%. What price per yard did the merchant pay for the cloth?

**27.** By selling hats at a profit of 40¢ apiece a dealer makes 25%. Find the cost of the hats. Find the selling price of the hats.

**28.** A man spends annually 45% of his salary. If his expenses are $315 a year, what is his annual salary?

**29.** A man saves 60% of his annual salary. If he saves $540 a year, what is his annual salary?

**30.** 15% of the price of a ton of hay is $1.80. Find the price of a ton of hay.

**31.** During one month the price of wheat fell 10%. If this amounts to 8¢ a bushel, find the price of a bushel of wheat before the decline in price.

**32.** If a man buys a house and spends 8% of its cost in painting it and making other necessary repairs, and his bill for this work amounts to $280, what did he pay for the house?

**33.** A pupil is absent 14 da. during the school year. If his per cent of absence is 8, how many days are in the school year?

**34.** In an examination a candidate fails to answer 6 of the questions. If this number is 8% of the entire number of questions, how many questions were asked in the examination?

**35.** 5% of the taxes of a city are non-collectible. If the total amount of taxes not collected is $7,000, find the amount of taxes levied in the city.

**36.** The population of a city increased in 10 yr. 27,000. If the increase of population for the 10 yr. was 6%, what was the population of the city?

**37.** The number of cabin passengers on a steamer was 16% of the number of passengers. If the number of cabin passengers was 256, find the number of passengers on the steamer.

**38.** 12% of the distance from New York to Philadelphia is 10.8 miles. Find the distance from New York to Philadelphia.

**39.** 5% of a certain ore is silver. If the ore yields 320 lb. of silver, find the weight of the ore.

**40.** A man buys a hat and a suit of clothes. He pays \$1.50 for the hat, which is $8\frac{1}{3}\%$ of the price paid for the suit of clothes. Find the price of the suit of clothes.

**41.** The cost of repairing a building was \$18,000, which was 15% of the original cost of the building. What did the building cost?

## No. 78

**1.** If a farmer raises 120 bushels of potatoes and sells 18 bushels, what per cent of his crop of potatoes does he sell?

SOLUTION. 120 bu. = 100 % of the crop.

Therefore, 1 bu. = $\frac{100}{120}$ % of the crop.

Therefore, 18 bu. = $\frac{100\% \times 18}{120}$ of the crop = 15% of the crop. *Ans.* 15%.

**2.** What per cent of 5 is 2?

SOLUTION. $5 = 100\,\%$ of 5.

Therefore, $1 = \frac{100}{5}\,\%$ of 5.

Therefore, $2 = \frac{100\,\% \times 2}{5}$ of $5 = 40\,\%$ of 5.

*Ans.* 40 %.

ANOTHER SOLUTION. $2 = \frac{2}{5}$ of 5.

$\frac{2}{5}$ of a quantity $= 40\,\%$ of the quantity.

Therefore, $\frac{2}{5}$ of $5 = 40\,\%$ of 5. *Ans.* 40 %.

What per cent of:

**1.** 4 is 1?
**2.** 5 is 3?
**3.** 5 is 4?
**4.** 6 is 1?
**5.** 6 is 3?
**6.** 6 is 4?
**7.** 6 is 5?
**8.** 8 is 1?
**9.** 8 is 2?
**10.** 8 is 3?
**11.** 8 is 5?
**12.** 8 is 7?
**13.** 9 is 1?
**14.** 9 is 2?
**15.** 10 is 3?
**16.** 10 is 7?
**17.** 12 is 5?
**18.** 12 is 7?
**19.** 12 is 9?
**20.** 15 is 1?
**21.** 15 is 4?
**22.** 15 is 7?
**23.** 15 is 8?
**24.** 16 is 1?
**25.** 16 is 5?
**26.** 16 is 7?
**27.** 20 is 1?
**28.** 20 is 3?
**29.** 20 is 7?
**30.** 25 is 2?
**31.** 25 is 3?
**32.** 25 is 4?
**33.** 25 is 7?
**34.** 1 is 1?
**35.** 5 is 5?
**36.** $\frac{2}{3}$ is $\frac{2}{3}$?

**37.** 1 hr. is 1 min.?
**38.** 1 hr. is 2 min.?
**39.** 1 hr. is 3 min.?
**40.** 1 hr. is 4 min.?
**41.** 1 hr. is 5 min.?
**42.** 1 hr. is 6 min.?
**43.** 1 hr. is 7 min.?
**44.** 1 hr. is 8 min.?
**45.** 1 hr. is 10 min.?
**46.** 1 hr. is 12 min.?
**47.** 1 hr. is 15 min.?
**48.** 1 hr. is 18 min.?

49. 1 hr. is 20 min.?
50. 1 hr. is 24 min.?
51. 1 hr. is 36 min.?
52. 1 hr. is 45 min.?
53. 1 da. is 1 hr.?
54. 1 da. is 3 hr.?
55. 1 da. is 4 hr.?
56. 1 da. is 6 hr.?
57. 1 da. is 8 hr.?
58. 1 da. is 9 hr.?
59. 1 da. is 15 hr.?
60. 1 da. is 20 hr.?
61. 1 da. is $1\frac{1}{2}$ da.?
62. 1 yd. is 2 ft.?
63. 1 yd. is 2 ft. 3 in.?
64. 1 yd. is 1 ft. 8 in.?
65. 1 yd. is 9 in.?
66. 1 yd. is 8 in.?
67. 1 yd. is 1 yd. 1 ft.?
68. 1 yd. is 2 ft.?
69. 1 yd. is $2\frac{1}{2}$ yd.?
70. 1 yd. is $2\frac{1}{2}$ ft.?
71. 1 yd. is 1 ft. 9 in.?
72. 1 A. is 1 sq. rd.?
73. 1 A. is 2 sq. rd.?
74. 1 A. is 3 sq. rd.?
75. 1 A. is 4 sq. rd.?
76. 1 A. is 8 sq. rd.?
77. 1 A. is 10 sq. rd.?
78. 1 A. is 16 sq. rd.?
79. 1 A. is 20 sq. rd.?
80. 1 A. is 32 sq. rd.?
81. 1 A. is 40 sq. rd.?
82. 1 A. is 60 sq. rd.?
83. 1 A. is 64 sq. rd.?
84. 1 A. is 80 sq. rd.?
85. 1 A. is $106\frac{2}{3}$ sq. rd.?
86. 1 A. is 128 sq. rd.?
87. 1 A. is $1\frac{2}{3}$ A.?
88. 1 A. is $1\frac{1}{4}$ A.?
89. \$1 is 2¢?
90. \$1 is 4¢?
91. \$1 is 7¢?
92. \$1 is 9¢?
93. \$1 is 12¢?
94. \$1 is 17¢?
95. \$1 is 25¢?
96. \$1 is 35¢?
97. \$1 is 54¢?
98. 1 T. is 100 lb.?

99. 1 T. is 300 lb.?
100. 1 T. is 700 lb.?
101. 1 T. is 900 lb.?
102. 1 T. is 70 lb.?
103. 1 T. is 80 lb.?
104. 1 T. is 60 lb.?
105. 1 T. is 40 lb.?
106. 1 T. is 50 lb.?
107. 1 T. is 30 lb.?
108. 1 T. is 20 lb.?
109. 1 T. is 10 lb.?
110. 1 T. is 2,500 lb.?
111. 1 T. is 2,800 lb.?
112. 1 T. is 750 lb.?
113. 1 T. is 1,250 lb.?
114. 1 T. is 1,750 lb.?

115. If the cost of an article is \$5 and the selling price is \$7, what is the gain per cent?

SOLUTION. On \$5 the gain is \$2.

Therefore, on \$1 the gain is $\$\frac{2}{5}$.

Therefore, on \$100 the gain is $\frac{\$2 \times 100}{5} = \$40$.

*Ans.* 40%.

116. Sheep are bought at \$6 a head and sold at \$7 a head. What is the gain per cent?

117. If cattle are bought at \$40 a head and sold at \$45 a head, what is the gain per cent?

118. If I buy a lot for \$1,200 and sell it for \$1,500, what is the gain per cent?

119. If oranges are bought for 2¢ apiece and sold for 3¢ apiece, what is the gain per cent?

120. If cloth is bought at 80¢ a yard and sold at \$1 a yard, what is the gain per cent?

121. If wheat is bought at 80¢ a bushel and sold at 75¢ a bushel, what is the loss per cent?

**122.** When apples are bought at \$2 a barrel and sold at \$2.20 a barrel, what is the gain per cent?

**123.** If I buy a tract of land for \$2,000 and sell it for \$1,900, what is my loss per cent?

**124.** When flour is bought at \$4 a barrel and sold at \$4.32, what is the gain per cent?

**125.** When oats are bought at 25¢ a bushel and sold at 28¢ a bushel, what is the gain per cent?

**126.** If a horse is bought for \$60 and sold for \$54, what is the loss per cent?

## No. 79

**1.** If goods are sold at a loss of $16\frac{2}{3}\%$, what per cent of the cost price is the selling price?

SOLUTION. Cost price = 100% of cost price.

Selling price = cost price − $16\frac{2}{3}\%$ of cost price.

Therefore, selling price = 100% of cost price − $16\frac{2}{3}\%$ of cost price,

= $83\frac{1}{3}\%$ of cost price.

**2.** If they were sold at a loss of 10%, what per cent of the cost price was the selling price?

**3.** If cloth is sold at a loss of 15%, what per cent of the cost price is the selling price?

**4.** If I sell a horse at a loss of $12\frac{1}{2}\%$, what per cent of the cost price do I get for the horse?

5. When land is sold at a loss of 11%, what per cent of the cost price of the land is the selling price?

6. When tea is sold at a profit of 25%, for what per cent of the cost price is the tea sold?

7. Oranges are sold at a profit of 60%. For what per cent of the cost price are the oranges sold?

8. Butter is sold at a profit of $33\frac{1}{3}\%$. What per cent of the cost price is the selling price of butter?

9. Raisins are sold at a profit of $37\frac{1}{2}\%$. What per cent of the cost price is the selling price of raisins?

10. A commission merchant sells cotton at a commission of 4%. What per cent of the selling price of the cotton does the owner of the cotton get?

11. A property owner has an agent to collect his rent. The agent charges 6% commission. What per cent of the rent does the property owner get?

12. A lawyer collects a debt, charging 8% of the amount collected as a fee. What per cent of the debt does he remit to his client?

13. A broker charges $\frac{1}{8}\%$ for selling stocks. What per cent of the value of stocks does his principal receive?

14. $4\frac{1}{2}\%$ of the taxes of a city is non-collectible. What per cent of the taxes is collectible?

15. A wholesale dealer imports books paying 25% duty. What per cent of the invoice price of the books is the cost of the books?

## No. 80

1. A violin was sold for \$10 at a profit of 25%. Find the cost of the violin.

SOLUTION.

100% of the cost + 25% of the cost = 125% of the cost.

125% of the cost = \$10.

Therefore, 1% of the cost = $\$\frac{10}{125}$.

Therefore, 100% of the cost = $\frac{\$10 \times 100}{125} = \$8$.

*Ans.* \$8.

This question may also be solved as follows:

25% of cost = $\frac{1}{4}$ of cost.

Cost + $\frac{1}{4}$ of cost = $1\frac{1}{4}$ times cost, or $\frac{5}{4}$ of cost.

$\frac{5}{4}$ of cost = \$10.

Therefore, $\frac{1}{4}$ of cost = $\$\frac{10}{5}$.

Therefore, $\frac{4}{4}$ of cost = $\frac{\$10 \times 4}{5} = \$8$. *Ans.* \$8.

2. A man sells a horse for \$121, gaining thereby 10%. Find the cost of the horse.

3. A man sells a tract of land for \$4,500, and gains 25% of the cost of the land. What was the cost of the land?

4. A merchant increases his capital by 20%, and then has \$8,400 in the business. How much did he have in the business at first?

5. A farmer increases the number of trees in his apple orchard by 15%. If the orchard now contains

460 trees, how many trees did it originally contain? How many additional trees did the farmer plant?

6. A's money is 30% more than B's. If A's money is $520, what is B's money?

7. A teacher receives an increase of 10% of her salary. If her salary is then $88, what was her original salary?

8. If the number of desks in a schoolroom is increased 20%, and the room then contains 42 desks, how many desks were in the room originally?

9. The enrollment in the schools of a certain city increased in one year 5%. If it then was 5,250, what was the enrollment before the increase?

10. A house was sold for $3,000, at a profit of 20%. What was the cost price of the house?

11. By selling oranges at 5¢ apiece a dealer makes a profit of 20%. How much did the dealer pay for the oranges?

12. By selling melons 2 for 25¢ a dealer makes a profit of 25%. How much did the melons cost the dealer?

13. By selling a piano for $180 a music dealer makes a profit of $33\frac{1}{3}$%. What did the piano cost the music dealer?

14. What number increased by 15% of itself is 230?

15. What number is 85 when increased by 25% of itself?

**16.** What number increased by $16\frac{2}{3}$ of itself becomes 49?

**17.** What number increased by $12\frac{1}{2}\%$ of itself equals 81?

**18.** What number increased by $37\frac{1}{2}\%$ of itself equals 143?

**19.** What number increased by $62\frac{1}{2}\%$ of itself equals 156?

**20.** What number increased by $8\frac{1}{3}\%$ of itself equals 104?

**21.** By selling wheat at 70¢ a bushel I lose $12\frac{1}{2}\%$ of the cost of the wheat. What was the cost price of the wheat?

SOLUTION. $12\frac{1}{2}\%$ of cost $= \frac{1}{8}$ of cost.

Therefore, cost $- 12\frac{1}{2}\%$ of cost $= \frac{7}{8}$ of cost = selling price.

Therefore, $\frac{7}{8}$ of cost = 70¢.

Therefore, $\frac{1}{8}$ of cost = 10¢.

Therefore, $\frac{8}{8}$ of cost = 80¢. *Ans.* 80¢.

**22.** By selling land at \$40 an acre I lose 20% of the cost. What did I pay for the land?

**23.** A horse is sold for \$140, which is at a loss of 20%. What did the horse cost?

**24.** By selling apples at \$1.90 a barrel a dealer loses 5%. What did the apples cost the dealer?

**25.** A sells goods to B at a loss of 15%. If B paid \$170 for the goods, find the price A paid for the goods.

**26.** After removing 14 % of the desks from a schoolroom there remained 43 desks. How many desks were in the room at first?

**27.** Ten per cent of the registered voters of a city failed to vote at an election. If the number of votes cast was 6,300, find the number of registered voters in the city.

**28.** A dry goods merchant buys a stock of damaged goods at a discount of 30%. If he pays for the goods $840, what was the original cost of the goods?

**29.** After selling 32% of the number of tons of coal in a coal yard, a merchant has 136 tons. How many tons were in the yard originally?

**30.** A real estate agent sold a piece of property, charging 5% commission, and remitted to his principal $3,800. At what price did he sell the property?

**31.** A commission merchant sells a quantity of hay on commission, charging 4%. If he remits to his principal $12 for every ton of hay sold, find the price per ton at which the hay sold.

**32.** A bookkeeper spends 40% of his annual salary. If he saves $720 a year, what is his annual salary?

**33.** A man sold $16\frac{2}{3}$% of his herd of cattle, and then had 175. How many cattle had he at first?

**34.** What number diminished by 6% of itself equals 188?

35. What number diminished by 12% of itself equals 264?

36. What number diminished by 19% of itself equals 648?

37. What number diminished by $7\frac{1}{2}\%$ of itself equals 185?

38. What number diminished by $33\frac{1}{3}\%$ of itself equals 22?

39. What number diminished by 27% of itself equals 219?

40. What number diminished by 35% of itself equals 325?

41. What number diminished by 54% of itself equals 184?

42. What number diminished by $62\frac{1}{2}\%$ of itself equals 39?

## No. 80

1. A yard of cloth was sold for \$1.80 at a loss of 10%. What should the selling price have been to make a profit of 15%?

SOLUTION. 90% of cost = \$1.80.

Therefore, $1\%$ of cost $= \frac{\$1.80}{90} = \$.02$.

Therefore, $115\%$ of cost $= \$.02 \times 115 = \$2.30$.

*Ans.* \$2.30.

2. A horse was sold for \$160 at a loss of 20%. What should the selling price have been in order to make a profit of 10%?

3. A piano was sold for $240 at a profit of 20%. What should the selling price have been in order to make a profit of 15%?

4. A straw hat is sold for $2 at a profit of 25%. How should straw hats be marked in order to make a profit of 20%?

5. A horse was sold for $196 at a loss of 2%. What should the selling price of the horse have been to make a profit of 3%?

6. Hay was sold at $12 a ton at a loss of 4%. At what should it have been sold to make a profit of 20%?

7. On books listed at $1.50 a dealer makes a profit of 20%. How should they be marked in order to make a profit of 40%?

8. By selling tea at 75¢ a pound a merchant makes a profit of 25%. How should the tea be sold in order to make a profit of 15%?

9. A tract of land is sold for $2,000 at a profit of $33\frac{1}{3}\%$. At what price should the land be sold to make a profit of 20%?

10. By selling shoes at $4.50 a pair a merchant makes a profit of 50%. How should the merchant sell the shoes in order to make a profit of 30%?

11. By selling a suit of clothes at $18 a merchant makes a profit of 20%. At what price should the suit be sold in order to make a profit of 10%?

## INTEREST

### No. 82

Find the interest on:

1. $1,000 for 1 year at 3%.
2. $1,500 for 1 year at 4%.
3. $1,800 for 1 year at 5%.
4. $2,000 for 1 year at 6%.
5. $2,400 for 1 year at 5%.
6. $2,500 for 1 year at 7%.
7. $3,000 for 1 year at $4\frac{1}{2}$%.
8. $3,500 for 1 year at 4%.
9. $3,200 for 1 year at 5%.
10. $1,600 for 1 year at 6%.
11. $1,700 for 1 year at 5%.
12. $1,400 for 1 year at 7%.
13. $1,100 for 1 year at 8%.
14. $900 for 1 year at 8%.
15. $750 for 1 year at 4%.
16. $850 for 1 year at 4%.
17. $600 for 1 year at 6%.

18. $550 for 1 year at 4%.
19. $450 for 1 year at 4%.
20. $350 for 1 year at 6%.
21. $250 for 1 year at 4%.
22. $150 for 1 year at 6%.
23. $650 for 1 year at 3%.
24. $250 for 1 year at 9%.
25. $575 for 1 year at 10%.
26. $954 for 1 year at 10%.
27. $850 for 1 year at 3%.
28. $750 for 1 year at 5%.
29. $850 for 1 year at 6%.
30. $850 for 1 year at 8%.
31. $950 for 1 year at 7%.
32. $950 for 1 year at 8%.
33. $1,300 for 1 year at 4%.
34. $1,300 for 1 year at 7%.
35. $1,300 for 1 year at 9%.
36. $1,700 for 1 year at 3%.
37. $1,700 for 1 year at 7%.
38. $1,700 for 1 year at 9%.
39. $1,700 for 1 year at 12%.
40. $1,900 for 1 year at 4%.
41. $1,900 for 1 year at 5%.
42. $1,900 for 1 year at 8%.

43. $2,100 for 1 year at 5%.

44. $2,100 for 1 year at 9%.

45. $2,100 for 1 year at 12%.

46. $1,350 for 1 year at 4%.

47. $1,550 for 1 year at 5%.

48. $1,600 for 1 year at 7%.

1. What is the interest on $750 for 1 mo. 15 da. at 4%?

SOLUTION. The interest on $750 for 1 yr. = 4% of $750 = $30.

1 mo. 15 da. = $1\frac{1}{2}$ mo. = $\frac{1}{8}$ of 1 yr.

Therefore, the interest on $750 for 1 mo. 15 da. = $\frac{1}{8}$ of $30 = $3.75. *Ans.* $3.75.

2. Find the interest on $200 for 4 months at 6%.

3. Find the interest on $200 for 3 months at 8%.

4. Find the interest on $150 for 6 months at 6%.

5. Find the interest on $250 for 4 months at 6%.

6. Find the interest on $250 for 3 months at 4%.

7. Find the interest on $300 for 3 months at 4%.

8. Find the interest on $300 for 4 months at 5%.

9. Find the interest on $350 for 4 months at 6%.

10. Find the interest on $400 for 9 months at 4%.

11. What is the interest on $600 for 9 months at 8%?

12. What is the interest on $600 for 8 months at 6%?
13. What is the interest on $600 for 5 months at 5%?
14. What is the interest on $700 for 4 months at 4%?
15. What is the interest on $700 for 3 months at 5%?
16. What is the interest on $750 for 1 month at 6%?
17. What is the interest on $750 for 2 months at 5%?
18. What is the interest on $800 for 3 months at 4%?
19. What is the interest on $800 for 9 months at 5%?
20. What is the interest on $800 for 8 months at 6%?
21. What is the interest on $900 for 8 months at 4%?

Find the interest on:

22. $850 for 3 months at 8%.
23. $950 for 6 months at 4%.
24. $1,000 for 1 month at 6%.
25. $1,000 for 3 months at 8%.
26. $1,000 for 4 months at 9%.
27. $150 for 1 month at 8%.
28. $250 for 6 months at 5%.
29. $360 for 1 month at 5%.
30. $300 for 1 month at 6%.
31. $240 for 2 months at 6%.
32. $320 for 3 months at 5%.
33. $420 for 4 months at 5%.
34. $450 for 4 months at 4%.

35. $480 for 3 months at 5%.
36. $500 for 9 months at 8%.
37. $500 for 8 months at 9%.
38. $540 for 2 months at 5%.
39. $560 for 3 months at 10%.
40. $600 for 2 months at 2%.
41. $640 for 3 months at 5%.
42. $720 for 1 month at 5%.
43. $800 for 1 month 15 days at 8%.
44. $840 for 2 months at 5%.
45. $850 for 3 months at 4%.
46. $900 for 4 months at 5%.
47. $950 for 1 month at 10%.
48. $1,200 for 2 months at 5%.
49. $120 for 2 months at 6%.
50. $180 for 2 months at 5%.
51. $200 for 1 month at 6%.
52. $200 for 2 months at 9%.
53. $240 for 1 month at 10%.
54. $280 for 3 months at 5%.
55. $300 for 5 months at 12%.
56. $350 for 3 months at 4%.
57. $450 for 8 months at 6%.
58. $440 for 6 months at 5%.
59. $460 for 6 months at 5%.

60. $550 for 6 months at 4%.
61. $580 for 6 months at 5%.
62. $620 for 3 months at 5%.
63. $660 for 4 months at 5%.
64. $680 for 3 months at 5%.
65. $700 for 3 months at 10%.
66. $720 for 1 month at 4%.
67. $750 for 6 months at 4%.
68. $780 for 6 months at 5%.
69. $820 for 6 months at 5%.
70. $840 for 1 month at 10%.
71. $880 for 3 months at 5%.
72. $850 for 2 months at 6%.
73. $940 for 3 months at 5%.
74. $960 for 5 months at 10%.
75. $980 for 1 month at 10%.

## No. 83

1. Find the rate per cent when the interest on $500 for 1 yr. is $40.

SOLUTION. Interest on $500 for 1 yr. = $40.

Therefore, interest on $100 for 1 yr. $= \frac{\$40}{5} = \$8$.

*Ans.* 8%.

2. Find the rate per cent when the interest on $780 for 1 yr. is $31.20.

SOLUTION. Interest on $780 for 1 yr. = $31.20.

Therefore, interest on $1 for 1 yr. = $0.04.

Therefore, interest on $100 for 1 yr. = $4.

Find the rate per cent: *Ans.* 4%.

1. When the interest on $300 for 1 yr. is $18; $24; $30.

2. When the interest on $400 for 1 yr. is $16; $24; $27.

3. When the interest on $500 for 1 yr. is $15; $25; $27.50.

4. When the interest on $600 for 1 yr. is $24; $36; $39.

5. When the interest on $700 for 1 yr. is $21; $35; $45.50.

6. When the interest on $800 for 1 yr. is $32; $48; $60.

7. When the interest on $900 for 1 yr. is $36; $54; $75.

8. When the interest on $1,000 for 1 yr. is $45; $55; $75.

9. When the interest on $1,100 for 1 yr. is $44; $70.50; $88.

10. When the interest on $1,200 for 1 yr. is $52; $78; $97.50.

**11.** When the interest on \$1,400 for 1 yr. is \$70; \$98; \$119.

**12.** When the interest on \$400 for 1 yr. is \$7; \$11; \$17.

**13.** When the interest on \$1,500 for 1 yr. is \$75; \$105; \$127.50.

**14.** When the interest on \$1,600 for 1 yr. is \$72; \$96; \$120.

**15.** When the interest on \$1,800 for 1 yr. is \$45; \$90; \$126.

**16.** When the interest on \$2,000 for 1 yr. is \$90; \$130; \$150.

**17.** When the interest on \$250 for 1 yr. is \$12.50; \$17.50.

**18.** When the interest on \$360 for 1 yr. is \$14.40; \$21.60.

**19.** When the interest on \$420 for 1 yr. is \$25.20; \$29.40.

**20.** When the interest on \$480 for 1 yr. is \$28.80; \$38.40.

**21.** When the interest on \$550 for 1 yr. is \$27.50; \$38.50.

**22.** When the interest on \$590 for 1 yr. is \$29; \$41.30.

**23.** When the interest on \$640 for 1 yr. is \$32; \$44.80.

**24.** When the interest on \$680 for 1 yr. is \$40.04; \$54.40.

**25.** When the interest on \$750 for 1 yr. is \$52.50; \$60.

**26.** When the interest on \$760 for 1 yr. is \$38; \$60.80.

**27.** When the interest on \$840 for 1 yr. is \$42; \$58.80.

**28.** When the interest on \$920 for 1 yr. is \$46; \$64.40.

**29.** When the interest on \$880 for 1 yr. is \$61.60; \$88.

**30.** When the interest on \$950 for 1 yr. is \$57; \$76.

**31.** When the interest on \$500 for 1 yr. is \$47.50; \$57.50.

**32.** When the interest on \$500 for 3 mo. is \$6.25.

SOLUTION. Interest on \$500 for $\frac{1}{4}$ of 1 yr. = \$6.25.

Therefore, interest on \$500 for $\frac{4}{4}$ of 1 yr. = \$6.25 $\times 4 =$ \$25.

Therefore, interest on \$100 for 1 yr. = \$5.

*Ans.* 5%.

**33.** When the interest on \$200 for 4 mo. is \$4; \$6.

**34.** When the interest on \$300 for 4 mo. is \$5; \$6.

**35.** When the interest on \$400 for 3 mo. is \$5; \$8.

**36.** When the interest on \$500 for 2 mo. is \$5; \$7.50.

**37.** When the interest on \$600 for 1 mo. is \$4; \$3.

**38.** When the interest on \$700 for 3 mo. is \$14; \$10.50.

**39.** When the interest on \$800 for 6 mo. is \$12; \$18.

**40.** When the interest on \$850 for 4 mo. is \$17; \$25.50.

**41.** When the interest on \$900 for 1 mo. is \$4.50; \$6.75.

**42.** When the interest on \$1,000 for 3 mo. is \$20; \$15.

**43.** When the interest on \$1,200 for 1 mo. is \$5; \$7.50.

**44.** When the interest on \$180 for 6 mo. is \$4.50; \$6.75.

**45.** When the interest on \$360 for 2 mo. is \$3.60; \$5.40.

## No. 84

**1.** In what time will \$750 produce \$7.50 interest at 5%?

SOLUTION.

Interest on \$750 for 1 yr. = 5% of \$750 = \$37.50.

$$\frac{\$7.50}{\$37.50} = \frac{1}{5}.$$

Therefore, \$750 produces \$7.50 int. in $\frac{1}{5}$ of 1 yr.

$\frac{1}{5}$ of 1 yr. = $\frac{1}{5}$ of 12 mo. = $2\frac{2}{5}$ mo.

$\frac{2}{5}$ of 1 mo. = $\frac{2}{5}$ of 30 da. = 12 da.

*Ans.* 2 mo. 12 da.

In what time:

1. Will $200 produce $6 interest at 6%?
2. Will $300 produce $5 interest at 5%?
3. Will $400 produce $14 interest at 7%?
4. Will $500 produce $2.50 interest at 6%?
5. Will $600 produce $3.50 interest at 7%?
6. Will $700 produce $12.25 interest at 7%?
7. Will $750 produce $9 interest at 6%?
8. Will $750 produce $5 interest at 8%?
9. Will $800 produce $42 interest at 7%?
10. Will $850 produce $34 interest at 6%?
11. Will $880 produce $55 interest at 5%?
12. Will $200 produce $10 interest at 4%?
13. Will $150 produce $12 interest at 6%?
14. Will $250 produce $12 interest at 4%?
15. Will $350 produce $3.50 interest at 4%?
16. Will $480 produce $2.40 interest at 6%?
17. Will $450 produce $4.50 interest at 5%?
18. Will $550 produce $22 interest at 6%?
19. Will $560 produce $16.80 interest at 6%?
20. Will $640 produce $4 interest at 5%?

## No. 85

1. What principal will produce $7.50 interest in 4 mo. at 9%?

SOLUTION. Interest on the principal for $\frac{1}{3}$ of 1 yr. = \$7.50.

Therefore, interest on the principal for 1 yr. = \$7.50 × 3 = \$22.50.

Interest on \$1 for 1 yr. = \$0.09.

\$0.09 × the number of dollars in the principal = \$22.50.

Therefore, number of dollars in the principal = 2250¢ ÷ 9¢ = 250. *Ans.* \$250.

What principal will produce :

2. \$12 interest in 1 year at 4% ?
3. \$20 interest in 1 year at 5% ?
4. \$24 interest in 1 year at 3% ?
5. \$26 interest in 1 year at 4% ?
6. \$27.50 interest in 1 year at 5% ?
7. \$14 interest in 6 months at 4% ?
8. \$32 interest in 6 months at 8% ?
9. \$10 interest in 3 months at 5% ?
10. \$14 interest in 4 months at 7% ?
11. \$9 interest in 72 days at 5% ?
12. \$8 interest in 60 days at 6% ?
13. \$49 interest in 6 months at 7% ?
14. \$102 interest in 1 year at 6% ?
15. \$9 interest in 60 days at 9% ?
16. \$7 interest in 45 days at 7% ?

17. $9.50 interest in 60 days at 3% ?

18. $15 interest in 4 months at 4% ?

19. $8 interest in 45 days at 8% ?

20. $13.60 interest in 72 days at 4% ?

## No. 86

1. What principal will amount to $510 in 90 da. at 8% ?

SOLUTION. Interest on $1 for 1 yr. = $0.08.

Therefore, interest on $1 for 90 da. = $\frac{1}{4}$ of $0.08 = $0.02.

Therefore, the amount of $1 for 90 da. at 8% = $1.02.

$1.02 × number of dollars in the principal = $510.

Therefore, number of dollars in the principal $= \frac{\$510}{\$1.02} = \$500$. *Ans.* $500.

What principal will amount to:

2. $636 in 1 year at 6% ?

3. $535 in 1 year at 7% ?

4. $756 in 1 year at 8% ?

5. $981 in 1 year at 9% ?

6. $1,248 in 1 year at 4% ?

7. $721 in 1 year at 3% ?

8. $816 in 6 months at 4% ?

9. $909 in 60 days at 6% ?

10. $515 in 6 months at 6% ?
11. $728 in 6 months at 8% ?
12. $840 in 6 months at 10% ?
13. $918 in 90 days at 8% ?
14. $816 in 120 days at 6% ?
15. $808 in 72 days at 5% ?
16. $707 in 45 days at 8% ?
17. $1,010 in 40 days at 9% ?
18. $714 in 72 days at 10% ?
19. $618 in 120 days at 9% ?
20. $1,040 in 120 days at 12% ?

# TRADE DISCOUNT

## No. 87

1. If the list price is $900 and a discount of 20% is allowed, find the selling price.

SOLUTION. 100% of list price − 20% of list price = selling price.

Therefore, 80% of $900 = selling price. *Ans.* $720.

2. On a bill of goods listed at $720 a merchant is allowed a discount of 25%. Find the cost of the goods.

3. A merchant buys goods listed at $800 and is allowed a discount of 10%. What does he pay for the goods?

4. A retail merchant is allowed a discount of 20% on a bill of goods amounting to $700. What do the goods cost him?

5. On a bill of merchandise amounting to $700 a merchant is allowed 5% off for cash. What is the cash value of the goods?

6. On a purchase of $800 worth of hardware a merchant is allowed a discount of 15%. Find the cost of the goods.

**7.** A discount of $16\frac{2}{3}\%$ is allowed on a bill of dry goods amounting to \$600. Find the cost of the goods.

**8.** A railway company bought rails listed at \$12,000 and was allowed a discount of $12\frac{1}{2}\%$. What did the rails cost the company?

**9.** $25\%$ is allowed on a bill amounting to \$500. What is the cash value of the bill?

**10.** A shoe merchant is allowed $33\frac{1}{3}\%$ off on a purchase listed at \$750. What is the cash value of the purchase?

**11.** A clothier is allowed a discount of $33\frac{1}{3}\%$ on a purchase of \$1,050. What is the cash value of his purchase?

**12.** A hatter is allowed $4\%$ off for cash on a purchase of \$750. What is the amount of his bill if he pays cash?

**13.** A bookseller is allowed $6\%$ off for cash. If his purchase amounts to \$800, what amount of cash will settle his bill?

**14.** A man sells a house and lot for \$4,000 and allows a discount of $5\%$ for cash. What is the cash value of the house and lot?

Find the cost if —

**15.** The list price is \$840 and a discount of $16\frac{2}{3}\%$ is allowed.

**16.** The list price is \$700 and a discount of $12\%$ is allowed.

**17.** The list price is \$650 and a discount of 20% is allowed.

**18.** The list price is \$560 and a discount of $12\frac{1}{2}\%$ is allowed.

**19.** The list price is \$880 and a discount of $37\frac{1}{2}\%$ is allowed.

**20.** The list price is \$3,200 and a discount of $31\frac{1}{4}\%$ is allowed.

**21.** The list price is \$2,400 and a discount of $37\frac{1}{2}\%$ is allowed.

# STOCKS

## No. 88

1. What will 10 shares of bank stock cost at 80, brokerage $\frac{1}{8}\%$?

SOLUTION. Cost of 1 share $= \$80 + \$\frac{1}{8} = \$80\frac{1}{8}$.

Therefore, cost of 10 shares $= \$80\frac{1}{8} \times 10 = \$801.25$.

2. What will 10 shares of bank stock cost at $79\frac{3}{4}$, brokerage $\frac{1}{8}\%$?

3. What will 20 shares of stock cost at $80\frac{3}{8}$, brokerage $\frac{1}{8}\%$?

4. What will 30 shares of stock cost at $69\frac{7}{8}$, brokerage $\frac{1}{8}\%$?

5. What will 50 shares of stock cost at $97\frac{7}{8}$, brokerage $\frac{1}{8}\%$?

6. What will 60 shares of stock cost at $75\frac{5}{8}$, brokerage $\frac{1}{8}\%$?

7. What will 80 shares of stock cost at $37\frac{3}{8}$, brokerage $\frac{1}{8}\%$?

8. What will 90 shares of stock cost at $89\frac{7}{8}$, brokerage $\frac{1}{8}\%$?

9. What will 40 shares of stock cost at $85\frac{5}{8}$, brokerage $\frac{1}{8}\%$?

10. What will 100 shares of stock cost at $119\frac{3}{4}$, brokerage $\frac{1}{8}\%$?

11. If 20 shares of stock quoted at $87\frac{1}{2}$, brokerage $\frac{1}{8}\%$, are sold, how much will they bring?

SOLUTION. 1 share brings $\$87\frac{1}{2} - \$\frac{1}{8} = \$87\frac{3}{8}$.

Therefore, 20 shares bring $\$87\frac{3}{8} \times 20 = \$1{,}747.50$.

Find the value of:

12. 20 shares of stock sold at $80\frac{1}{8}$, brokerage $\frac{1}{8}\%$.

13. 10 shares of stock sold at 89, brokerage $\frac{1}{8}\%$.

14. 40 shares of stock sold at $78\frac{7}{8}$, brokerage $\frac{1}{8}\%$.

15. 30 shares of stock sold at $90\frac{5}{8}$, brokerage $\frac{1}{8}\%$.

16. 20 shares of stock sold at $84\frac{5}{8}$, brokerage $\frac{1}{8}\%$.

17. 60 shares of stock sold at $72\frac{1}{8}$, brokerage $\frac{1}{8}\%$.

18. 40 shares of stock sold at $47\frac{7}{8}$, brokerage $\frac{1}{8}\%$.

19. 100 shares of stock sold at 99, brokerage $\frac{1}{8}\%$.

20. 80 shares of stock sold at 70, brokerage $\frac{1}{8}\%$.

## No. 89

1. What per cent will I realize on my investment, if I pay \$ 90 for 5 % stock?

SOLUTION. On \$ 90 I realize \$ 5.

Therefore, on \$ 1, I realize $\$\frac{5}{90}$.

Therefore, on \$100, I realize $\dfrac{\$5 \times 100}{90} = \$5\frac{5}{9}$.

*Ans.* $5\frac{5}{9}\%$.

What per cent will I realize on my investment, if I pay:

2. \$80 for 5% stock?
3. \$60 for 3% stock?
4. \$50 for 2% stock?
5. \$125 for 8% stock?
6. \$150 for 6% stock?
7. \$175 for 7% stock?
8. \$225 for 9% stock?
9. \$80 for $4\frac{1}{2}$% stock?
10. \$75 for $4\frac{1}{2}$% stock?
11. \$150 for 9% stock?
12. \$62.50 for 5% stock?
13. \$120 for 6% stock?
14. \$120 for 9% stock?
15. \$40 for $2\frac{1}{2}$% stock?

16. What must I pay for 4% stock to realize 5% interest on my money?

SOLUTION. 5% of the value of a share = \$4.
1% of the value of a share = $\$\frac{4}{5}$ = \$0.80.
100% of the value of a share = \$80. *Ans.* \$80.

What must I pay for:

17. 3% stock to realize 5% on my money?
18. 5% stock to realize $6\frac{1}{4}$% on my money?
19. 4% stock to realize $6\frac{2}{3}$% on my money?
20. 7% stock to realize $8\frac{1}{3}$% on my investment?
21. 6% stock to realize 10% on my money?
22. $3\frac{1}{2}$% stock to realize 5% on my money?
23. 3% stock to realize 4% on my money?
24. 8% stock to realize 5% on my investment?
25. 8% stock to realize $6\frac{1}{4}$% on my money?
26. 9% stock to realize $6\frac{2}{3}$% on my money?

**27.** Find the profit on 200 shares of stock bought at $79\frac{1}{2}$ and sold at $81\frac{3}{4}$, brokerage $\frac{1}{8}\%$ on each transaction?

SOLUTION. Selling price of 1 share $= \$81\frac{3}{4} - \$\frac{1}{8}$
$= \$81\frac{5}{8}$.

Cost price of 1 share $= \$79\frac{1}{2} + \$\frac{1}{8} = \$79\frac{5}{8}$.

Therefore, the profit on 1 share $= \$81\frac{5}{8} - \$79\frac{5}{8}$
$= \$2$.

Therefore, the profit on 200 $= \$2 \times 200 = \$400$.

Find the profit on:

**28.** 100 shares of stock bought at 80 and sold at $83\frac{1}{8}$, brokerage $\frac{1}{8}\%$ on each transaction.

**29.** 150 shares of stock bought at 92 and sold at $93\frac{1}{8}$, brokerage $\frac{1}{8}\%$ on each transaction.

**30.** 200 shares of stock bought at $95\frac{1}{2}$ and sold at $100\frac{1}{8}$, brokerage $\frac{1}{8}\%$ on each transaction.

**31.** 400 shares of stock bought at $104\frac{5}{8}$ and sold at $106\frac{1}{2}$, brokerage $\frac{1}{8}\%$ on each transaction.

**32.** 500 shares of stock bought at $70\frac{1}{2}$ and sold at $72\frac{1}{2}$, brokerage $\frac{1}{8}\%$ on each transaction.

Find the loss on:

**33.** 50 shares of stock bought at $67\frac{3}{4}$ and sold at 66, brokerage $\frac{1}{8}\%$ on each transaction.

**34.** 60 shares of stock bought at $179\frac{7}{8}$ and sold at 177, brokerage $\frac{1}{8}\%$ on each transaction.

**35.** Two hundred and fifty shares of stock bought at $57\frac{3}{4}$ and sold at 56, brokerage $\frac{1}{8}\%$ on each transaction.

**36.** Five hundred shares of stock bought at $67\frac{1}{4}$ and sold at 66, brokerage $\frac{1}{8}\%$ on each transaction.

**37.** How many shares of stock must be bought at $82 a share so that when sold at $85 a share a profit of $600 may be realized?

**38.** How many shares of stock must be bought at $\$91\frac{1}{2}$ a share and sold at $94 a share to realize a profit of $250?

**39.** How many shares of stock must be bought at $\$88\frac{1}{2}$ a share and sold at $90 a share to realize a profit of $750?

**40.** How many shares of stock must be bought at $79 a share and sold at $\$79\frac{1}{2}$ a share to realize a profit of $125?

**41.** How many shares of stock must be bought at $84 a share and sold at $\$85\frac{1}{8}$ a share to realize a profit of $900?

**42.** How many shares of stock must be bought at $\$66\frac{1}{2}$ a share and sold at $\$68\frac{1}{2}$ a share to realize a profit of $150?

**43.** How many shares of stock must be bought at $\$150\frac{3}{4}$ a share and sold at $\$151\frac{1}{2}$ a share to realize a profit of $1,500?

**44.** Find the brokerage on 5,000 shares of stock at the usual rate, $\frac{1}{8}\%$.

**45.** Find the brokerage on 7,200 shares of stock t $\frac{1}{8}\%$.

**46.** How many shares of stock must a broker sell o make \$150, brokerage $\frac{1}{8}\%$?

**47.** How many shares of stock must a broker sell o make \$125, brokerage $\frac{1}{8}\%$?

# RATIO AND PROPORTION

## No. 90

Find the value of each of the following ratios :

| | | |
|---|---|---|
| 1. $24 : 36$. | 6. $72 : 90$. | 11. $4\frac{1}{2} : 5\frac{1}{2}$. |
| 2. $36 : 54$. | 7. $78 : 91$. | 12. $1\frac{1}{8}$ mi. : $\frac{1}{2}$ mi. |
| 3. $24 : 51$. | 8. $\frac{3}{4} : \frac{1}{2}$. | 13. $\frac{1}{2} : \frac{5}{8}$. |
| 4. $36 : 48$. | 9. $.5 : .7$. | 14. $2\frac{3}{7} : 2\frac{6}{7}$. |
| 5. $42 : 56$. | 10. $\frac{7}{12} : \frac{3}{4}$. | 15. $2\frac{7}{8} : 3\frac{5}{8}$. |

16. The rate of a freight train is to that of a passenger train as $3 : 5$. If the rate of the freight train is 21 mi. an hour, what is the rate of the passenger train ?

17. The rate of a man rowing down a stream is to his rate rowing up the stream as $4 : 3$. If his rate downstream is 6 mi. an hour, what is his rate upstream ?

18. The price paid for a turkey is to the price paid for a duck in the ratio $7 : 2$. If a turkey costs $\$1.68$, find the price of a duck.

19. The rate of a steamer is to that of a sailboat as $7 : 3$. If the steamer has a speed of 21 knots an hour, what is the speed of the sailboat ?

**20.** Find the ratio of a long ton to a short ton.

**21.** Find the ratio of a pound Avoirdupois to a pound Troy.

**22.** Find the ratio of an ounce Avoirdupois to an ounce Troy.

**23.** Surveyors use a chain 4 rd. long. Railway engineers use a chain 100 ft. long. Find the ratio of a surveyor's chain to that of a railway engineer.

**24.** If I can row down a stream as far in 3 hr. as I can row up in 4 hr., what is the ratio of the rate of rowing down the stream to the rate of rowing up?

**25.** A passenger train runs as far in 3 hr. as a freight train runs in 5 hr. Find the ratio of the rate of the passenger train to that of the freight train.

**26.** If \$485 is equivalent to £100, find the ratio of the value of £1 to \$1.

**27.** 193 francs are equivalent to \$10. Find the ratio of the value of \$1 to that of a franc.

**28.** If A travels in 2 hr. the same distance that B travels in 3, compare their rates of travel.

**29.** If a train runs in 8 min. as far as a man can walk in 1 hr., compare the rate of the train to that of the man.

**30.** Divide \$20 in the inverse ratio of 3 to 2.

**31.** Divide \$70 in the inverse ratio of 4 to 3.

**32.** Divide \$100 in the inverse ratio of 3 to 7.

**33.** A man rows down a stream and back in 5 hours. If he rows 3 mi. downstream in the same time that he rows 2 mi. upstream, find the time of rowing down and the time of rowing up.

If he rows down and back, a distance of 24 mi. in all, find his rate of rowing down and his rate of rowing up.

**34.** A man rides a certain distance at the rate of 9 mi. an hour and walks back at the rate of 4 mi. an hour. How far does he ride if he returns in $6\frac{1}{2}$ hr.?

**35.** If 4 men do a piece of work in 10 da., how long will it take 5 men to do a piece of work equally great?

**36.** If 7 horses eat a quantity of hay in 8 da. how long will it take 4 horses to eat the same quantity of hay?

**37.** If 10 masons build a wall in 12 da., how long will it take 8 masons to build twice as large a wall?

**38.** If 6 men build $\frac{3}{4}$ of an embankment in 12 da., how long will it take 8 men to finish the embankment?

**39.** If 4 teams plow $\frac{2}{3}$ of a field in 6 da., how long will it take 6 teams to plow the remainder of the field?

**40.** A and B can do a piece of work in 10 days. If A can do $\frac{2}{5}$ as much as B, in what time can each alone do the work?

## THERMOMETERS

### No. 91

1. Change $-76°$ from the Fahrenheit scale to the Centigrade scale.

SOLUTION. $-76°$ means $76°$ below zero.

$76°$ below zero is $(76° + 32°)$ below freezing point = $108°$ below freezing point, Fahr.

$$180° \text{ Fahr.} = 100° \text{ C.}$$

Therefore, $1° \text{ Fahr.} = \frac{100° \text{ C.}}{180} = \frac{5° \text{ C}}{9}$.

Therefore, $108° \text{ Fahr.} = 5° \text{ C.} \times \frac{108}{9} = 60° \text{ C.}$

*Ans.* $60°$ C. below zero, or $-60°$ C.

Change to the Centigrade scale:

2. $42°$ Fahr.
3. $86°$ Fahr.
4. $95°$ Fahr.
5. $25°$ Fahr.
6. $14°$ Fahr.
7. $59°$ Fahr.
8. $50°$ Fahr.
9. $-4°$ Fahr.
10. $-22°$ Fahr.
11. $77°$ Fahr.
12. $-13°$ Fahr.
13. $-31°$ Fahr.
14. $68°$ Fahr.
15. $-58°$ Fahr.
16. $-103°$ Fahr.
17. $-148°$ Fahr.
18. $-90°$ Fahr.
19. $-40°$ Fahr.

Change to the Fahrenheit scale:

**20.** $-40°$ C.

SOLUTION. $-40°$ means $40°$ below freezing point on the Centigrade scale.

$$100° \text{ C.} = 180° \text{ Fahr.}$$

$$1° \text{ C.} = \frac{180° \text{ Fahr.}}{100} = \frac{9° \text{ Fahr.}}{5}.$$

Therefore, $$40° \text{ C.} = \frac{9° \text{ Fahr.} \times 40}{5} = 72° \text{ Fahr.}$$

$72°$ Fahr. below freezing is $(72° - 32°)$ below zero on the Fahrenheit scale. $72° - 32° = 40°$.

*Ans.* $40°$ below zero on the Fahrenheit scale, or $-40°$ Fahr.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **21.** | $25°$ C. | **24.** | $-10°$ C. | **27.** | $-5°$ C. | **30.** | $50°$ C. |
| **22.** | $-20°$ C. | **25.** | $10°$ C. | **28.** | $-25°$ C. | **31.** | $-14°$ C. |
| **23.** | $20°$ C. | **26.** | $5°$ C. | **29.** | $40°$ C. | **32.** | $-24°$ C. |

# THE METRIC SYSTEM

## No. 92

| | |
|---|---|
| 10 millimeters (mm.) | = 1 centimeter (cm.) |
| 10 centimeters | = 1 decimeter |
| 10 decimeters | = 1 meter (m.) |
| 10 meters | = 1 dekameter |
| 10 dekameters | = 1 hectometer |
| 10 hectometers | = 1 kilometer (km.) |

The length of a meter is 39.37+ in. It is .0000001 of a quadrant of a great circle on the earth's surface.

1. How many centimeters make 1 m.?
2. How many millimeters make 1 m.?
3. How many meters make 1 km.?
4. How many centimeters make 1 km.?

Reduce:

5. 9.82 m. to cm.
6. 2.5 m. to cm.
7. 17.28 m. to cm.
8. 1.234 m. to mm.
9. 3.792 m. to mm.
10. .075 m. to mm.
11. 27 km. to m.
12. 35.84 km. to m.
13. 39.283 km. to m.
14. 47.618 km. to m.

| | |
|---|---|
| 100 square millimeters (qmm.) | = 1 square centimeter (qcm.) |
| 100 square centimeters | = 1 square decimeter |
| 100 square decimeters | = 1 square meter (qm.) |
| 100 square meters | = 1 ar (a.) |
| 100 ars | = 1 hektar (ha.) |
| 100 hektars | = 1 square kilometer (qkm.) |

1. How many square meters are in 1 qkm.?
2. What name is given to a square dekameter?
3. How many square meters are in 1 ha.?
4. How does a square hektometer compare with a hectar?
5. How many square meters are in 15 square kilometers?
6. How many hectars are in a square kilometer?
7. How many ars are in 1 qkm.?
8. How many square decimeters are in 1 qm.?
9. How many square centimeters are in 1 qm.?
10. How many square millimeters are in 1 qcm.?
11. How many square millimeters are in 1 qm.?
12. How many square centimeters are in 1 a.?

| | |
|---|---|
| 1000 cubic millimeters (cmm.) | = 1 cubic centimeter (ccm.) |
| 1000 cubic centimeters | = 1 liter (l.) |
| 1000 liters | = 1 cubic meter (cbm.) |

1. How many liters are in 1 hl.?
2. How many liters are in 1 cbm.?
3. What part of a cubic meter is a hectoliter?

4. How many cubic centimeters are in 5.1 l.?
5. How many cubic meters are in 6.23 l.?
6. How many cubic millimeters are in 1 l.?
7. How many cubic millimeters are in 1 cbm.?
8. What part of a cubic meter is 1 cmm.?
9. What part of a cubic meter is 1 l.?
10. What part of a liter is 1 ccm.?
11. Reduce 2.73 cbm. to liters.
12. Reduce .072 cbm. to liters.
13. Reduce 5.37 l. to cubic centimeters.
14. Reduce 7.8 hl. to l.

| | |
|---|---|
| 1000 milligrams (mg.) | = 1 gram (g.) |
| 1000 grams | = 1 kilogram (kg.) |
| 1000 kilograms | = 1 tonneau (t.) |

1. Reduce 2.73 kg. to grams.
2. Reduce 8.79 kg. to grams.
3. Reduce 7.654 kg. to grams.
4. Reduce 9,499 g. to kilograms.
5. Reduce 1,000,000 g. to kilograms.
6. Reduce 2,000,000 mg. to kilograms.
7. Reduce 5,482 kg. to tonneaux.

## MISCELLANEOUS EXAMPLES

### No. 93

1. Find the difference between 4 and .004.

2. By how much does 100 exceed .01?

3. A man makes a 10¢ purchase and gives in payment a 10-dollar bill. How much change should he receive?

4. A man buys a straw hat for $1.50 and gives in payment a 20-dollar gold piece. What change should he get?

5. Find the value of 3 acres of land at $57.50 an acre.

6. Find the value of 100 bu. of wheat at $79\frac{1}{2}$¢ a bushel.

7. What is the value of 100 bu. of barley at $4\frac{3}{4}$¢ a bushel?

8. A man's property is assessed for taxes at $5,000. How much tax does he pay at $1.20 on the $100?

9. A man insures his house for 5 yr. at the rate of $1.50 per $100. What is the premium, if his house is valued at $5,000?

10. Multiply 3.4 by $10^3$.

**11.** Raise 10 to the 6th power.

**12.** Raise the numbers 1, 2, 3, 4, 5, to the 4th power.

**13.** What is the 5th power of 5?

**14.** What is the cube of 11?

**15.** What is the square root of each of the following numbers? 400, 900, 1,600, 6,400, 8,100, 4,900, 3,600, 10,000.

**16.** What is the square root of 1,000,000?

**17.** Cube 100.

**18.** Raise to the 5th power each of the following numbers: .1, .2, .3, .4, .5.

**19.** Raise each of the following numbers to the 4th power: .6, .7, .8, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$.

**20.** Multiply .7854 by $10^4$.

**21.** Multiply 3.14159 by $10^5$.

**22.** Reduce each of the following fractions to decimals: $\frac{5}{8}$, $\frac{2}{3}$, $\frac{7}{9}$, $\frac{11}{12}$, $\frac{5}{11}$, $\frac{2}{7}$, $\frac{5}{16}$, $\frac{1}{18}$.

**23.** A man walking on a railway at the rate of 4 mi. an hour is 10 mi. ahead of a passenger train running at the rate of 34 mi. an hour. How long will it take the passenger train to overtake the man?

**24.** A freight train leaves a station, running at the rate of 18 mi. an hour. Three hours later a passenger train leaves the same station, running at the rate of 30 mi. an hour. In how many hours will the pas-

senger train overtake the freight train? How many miles will the passenger train then have run?

**25.** A cistern can be filled by one pipe in 3 hr. and by another pipe in 5 hr. In what time will both pipes running together fill the cistern?

**26.** A cistern can be filled by one pipe in 3 hr. and emptied by another pipe in 4 hr. In what time will the cistern be filled by both pipes running together?

**27.** A man and a boy can do a piece of work in 1 hr. and 12 min. The boy can do the work in 3 hr. In what time can the man do the work?

**28.** A man can do as much work in 6 hr. as a boy can do in 8 hr. If they receive for 1 day's wages $3.50, how should they divide the money?

**29.** Give all the integral factors of 72.

**30.** Give all the integral factors of 84.

**31.** The product of two numbers is 108 and their G. C. M. is 6. Find the L. C. M. of the two numbers. What are the two numbers?

**32.** What number added to the sum of $\frac{1}{2}$ and $\frac{1}{3}$ will make 4?

**33.** A man sells $\frac{3}{7}$ of his land at one time and at another time $\frac{3}{4}$ of the remainder. What fraction of his land remains unsold?

**34.** What number diminished by $\frac{3}{5}$ of itself leaves 42 for remainder?

**35.** By how much does 4 yd. square exceed 4 sq. yd.?

**36.** From the square of $\frac{1}{2}$ take the cube of $\frac{1}{2}$.

**37.** What number multiplied by 7 will give for product $19\frac{1}{4}$?

**38.** 16% of a number is 72. What is 25% of the number?

**39.** When I can buy a bushel and a half of wheat for \$1.20, what should I pay for $1\frac{1}{4}$ bu. of wheat?

**40.** A room is 16 ft. by 20 ft. and 10 ft. high. What is the area of its four walls?

**41.** How many rods long is the N. W. $\frac{1}{4}$ of the N. W. $\frac{1}{4}$ of a section of land?

**42.** A tract of land contains 20 A.; it is twice as long as it is wide. Find its dimensions in rods.

**43.** A hall contains 243 sq. ft.; it is three times as long as it is wide. Find its dimensions.

**44.** How many revolutions will a wheel 16 ft. in circumference make in going a distance of 1 mi.?

**45.** At what time after 3 o'clock are the hour and minute hands of a watch $\frac{1}{12}$ of the circumference of the dial apart?

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